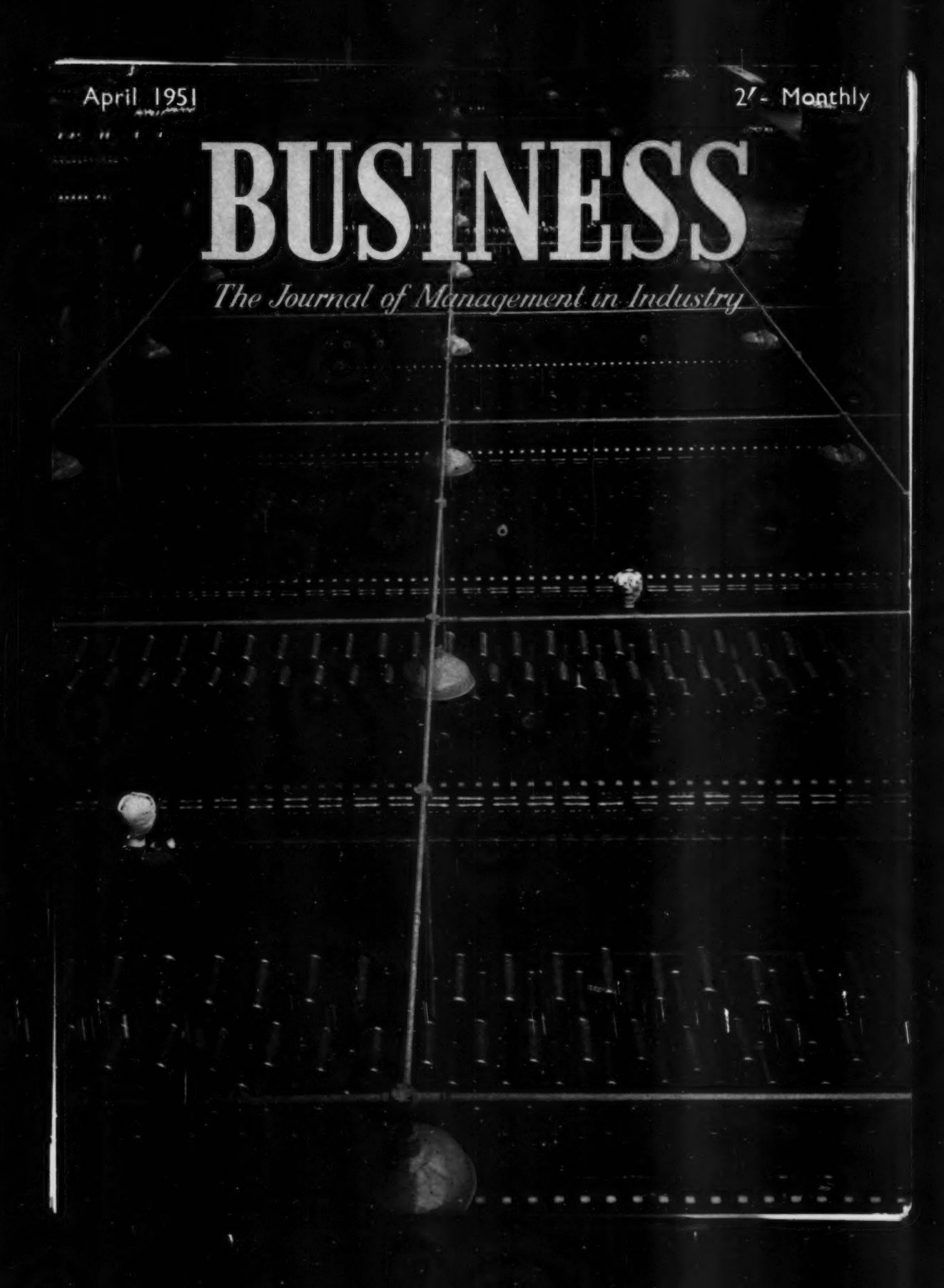


April 1951

2/- Monthly

BUSINESS

The Journal of Management in Industry





The problem of material and labour shortage

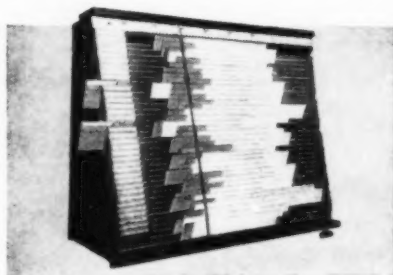
To make the most of machine-shop productivity, management needs an hour-by-hour picture of each machine's loading.

You know the capacity of your machines . . . but how quickly could you state their present loading? What would be necessary to find out? A frantic search through files, orders, job cards . . . hurried telephone calls about the works . . . broadcasts for key personnel?

Or the instant evidence of an efficient visual record?

The Machine Load Planner (illustrated) will show the jobs each machine has to do, is doing, or should have finished. It will state the target dates and record the performance so far. **IT WILL INCREASE MACHINE UTILISATION**

BECAUSE IT WILL REVEAL THE IDLE GAPS. Being flexible, it allows immediate adjustment for priorities. And it will do all this with far less clerical effort than any other method. With Remington Rand Systems, executive energy is freed for concentration on expanding export markets or for meeting rearmament's urgent needs.



Remington Rand Systems **MAKE PRODUCTION CONTROL EFFECTIVE**

Write to-day for descriptive literature on Machine Load Planner to:

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ONE FINGER...

that's all you need to operate this machine!



Dictaphone TIME-MASTER is the simplest dictating machine

Dictating machines were introduced to *simplify* office dictation. But if they are to help you crystallize that sudden idea or write that difficult letter, they must be *simple* to operate themselves.

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automatically backspaces and plays back your last few words so that you can instantly find your place or pick up the sense after an interruption.

The marvel of the Memobelt. Time-Master records on Memobelts, small plastic belts that give perfect recording quality. They retain the advantages of Dictaphone cylindrical recording — uniform speed and measured backspacing. Pliable and expendable, Memobelts may be filed *flat* or posted in a standard envelope.

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Regd. Trade Mark

**ELECTRONIC
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MADE IN GREAT BRITAIN. Branch Offices: LEEDS, NEWCASTLE, BIRMINGHAM, MANCHESTER, LIVERPOOL, BRISTOL, GLASGOW, DUBLIN, BELFAST, CORK
BUSINESS FOR APRIL, 1951



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Pressure proofed by patented process and tested at every stage. Only proven leads go into Venus Drawing Pencils



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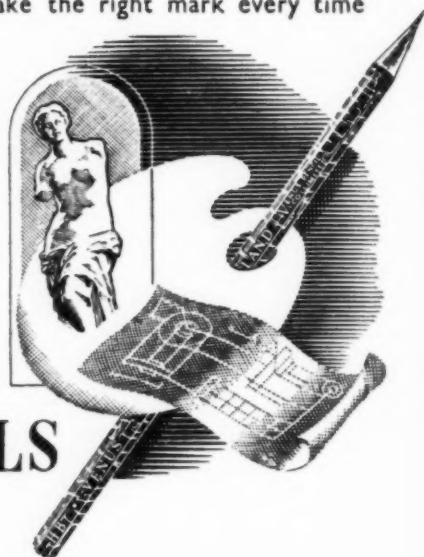
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Perfect PENCILS



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The BLICK range includes :

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- ★ Signature Time Recorders
- ★ Job Costers
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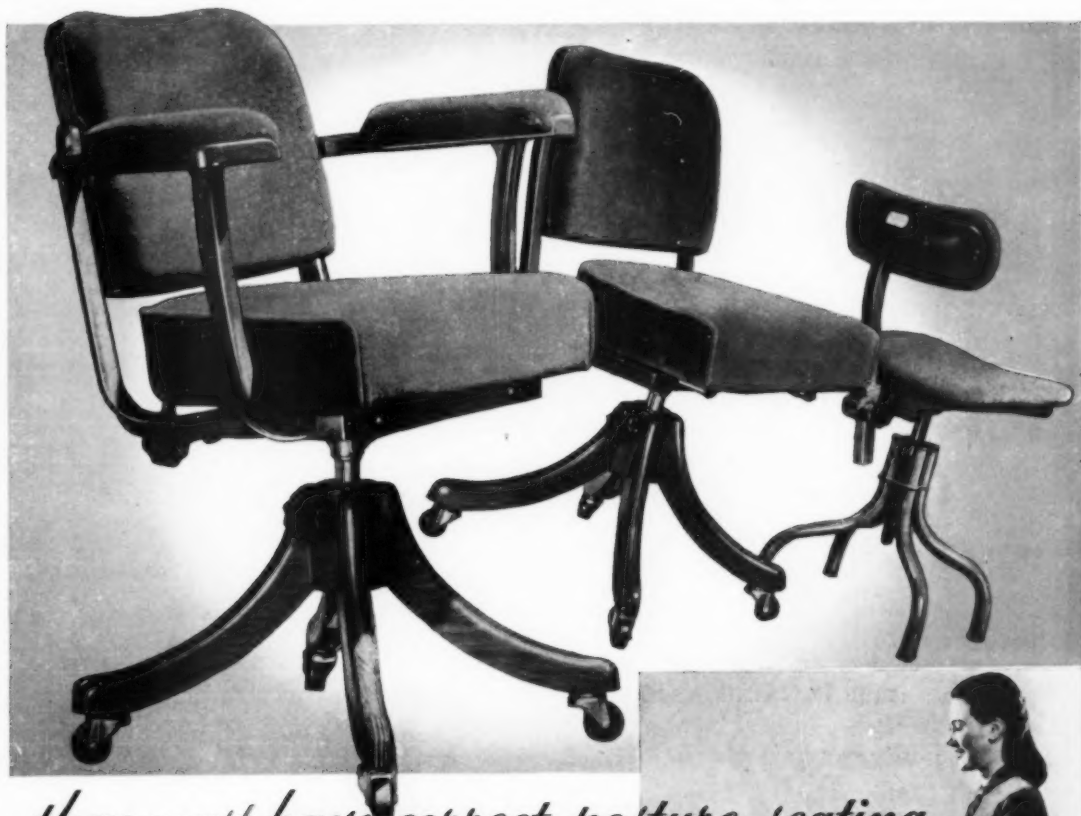
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APRIL 30

-MAY 11

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BIF means business!

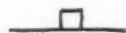
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H.E.

8

BU
BUSINESS

An illustration showing a pair of hands holding a rectangular punched card. The card has a grid of small circles (punch holes) arranged in rows and columns. The hands are positioned as if they are about to insert the card into a machine. The background is dark, and the card is brightly lit.

KNOWLEDGE at
his fingertips . . .

In an insecure and uncertain world, he is sure at least of the facts on which his finances are based — and certain that every possible implication which they hold can be presented to him at short notice. He relies on Hollerith punched card accounting.

Write or 'phone us, and we can arrange a demonstration to suit your entire convenience.

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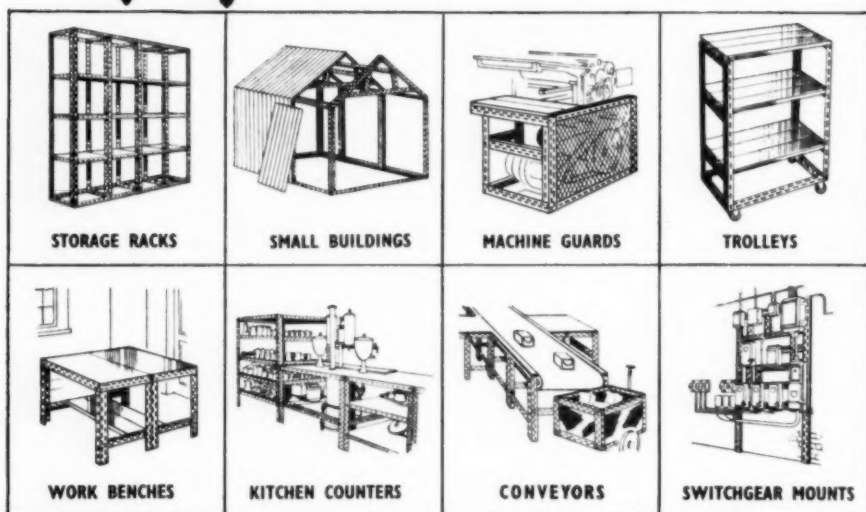
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Dexion Angle is protected by Brit. No. 620, 696 and world patents

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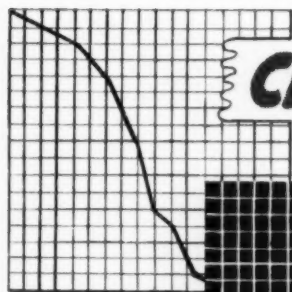


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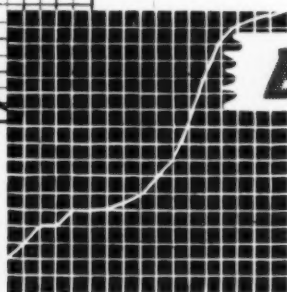
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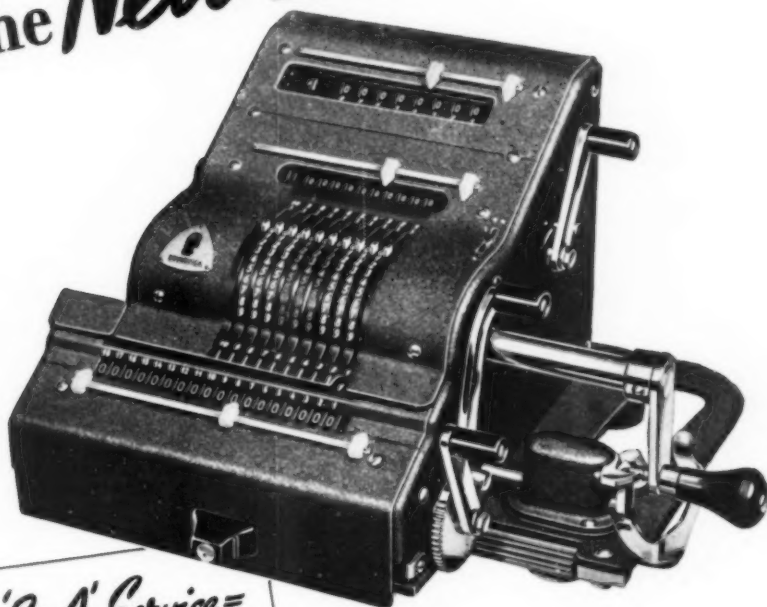
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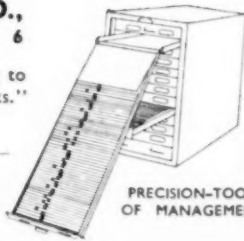
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THE MACHINE THAT COUNTS

pulls down production costs



High speed revolution
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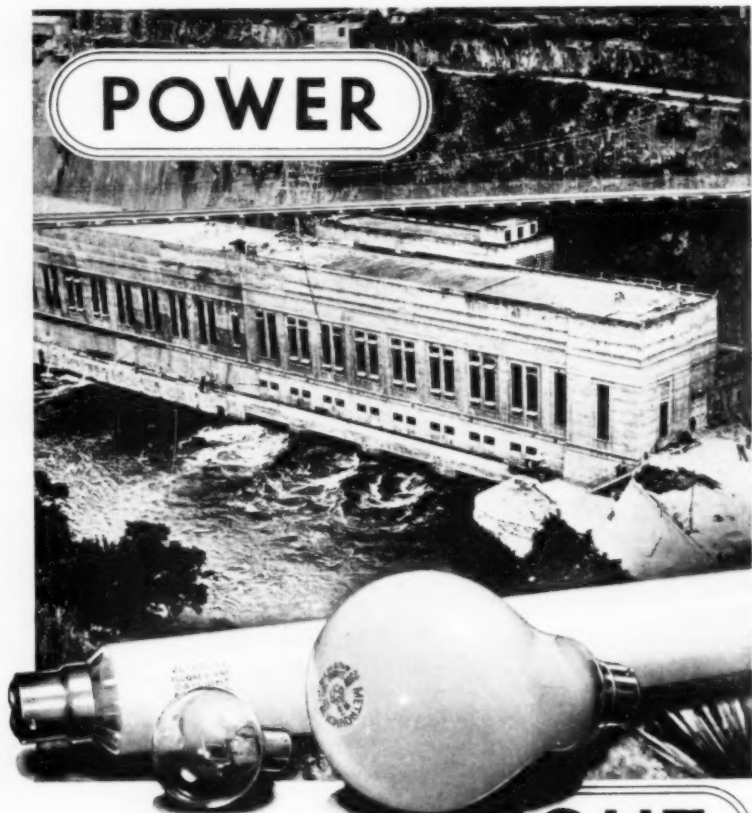
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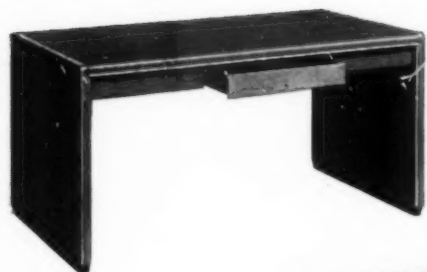
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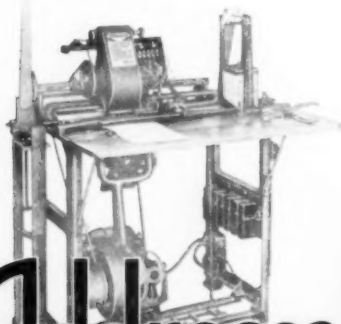
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17

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16 *vital points!*

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A well typed letter, like good stationery, is a credit to the sender and a compliment to the recipient.

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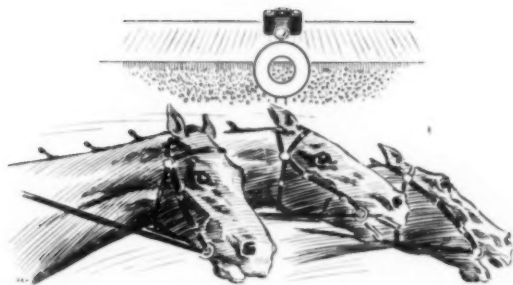
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One Addressing Machine Operator

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ONE-TIME CARBON UNIT SETS for tabulating and addressing machine use.

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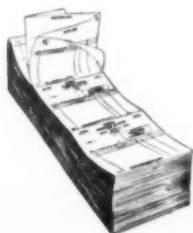
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for Forms*

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for Forms*

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for the smaller factory

M16 TIME RECORDER

- Super-fast automatic recording by simple one hand operation.
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- Automatic time signals.
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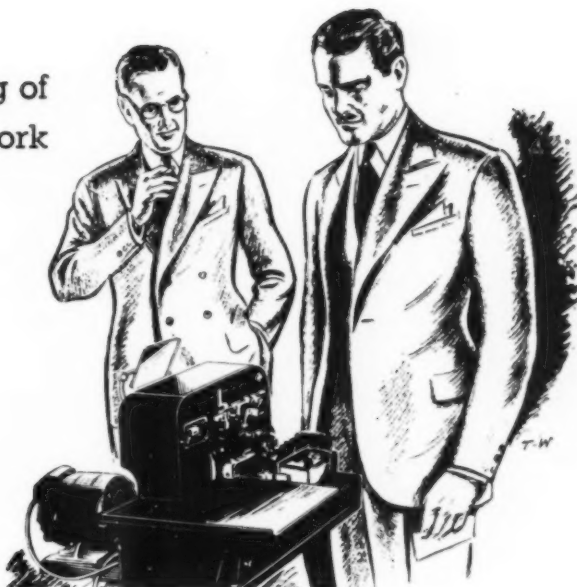
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The Powers-Samas punched card system gives you something in hand . . . enables a quart of work to be concentrated into a pint of time. Here is a report from a County Council in the Midlands testifying to this facility. The subject is Financial Control: *"Prior to the installation of punched cards all this work was carried out by keyboard accounting machines. There has been a considerable saving of time since it was transferred, fifty hours of work being concentrated into less than twenty-five hours."* In these days of rising costs and staff shortage any system that can halve the time taken on essential tasks demands investigation. Write or telephone and we will be happy to give you the fullest information. Without obligation, naturally.



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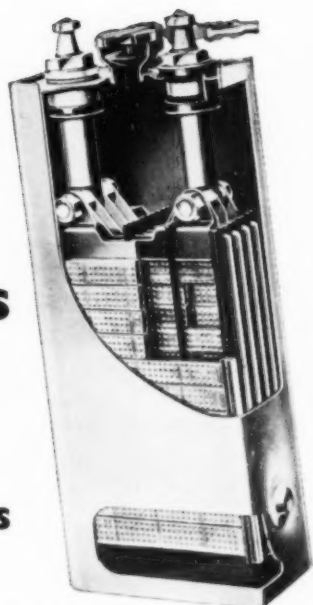


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**Your
fork
trucks
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Nife**

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OF STEEL**



*Repay their original cost
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★ Complete reliability ★ Low maintenance costs

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BUSINESS

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speeds production

INTERNAL BROADCASTING for staff location, time signals, works relations, announcements and music.

INTERNAL TELEPHONES

for speedy speech contact.

TIME CONTROL for making man-hours more productive.

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H-B12



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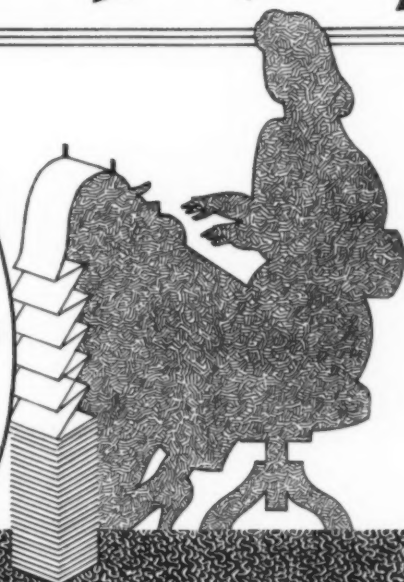
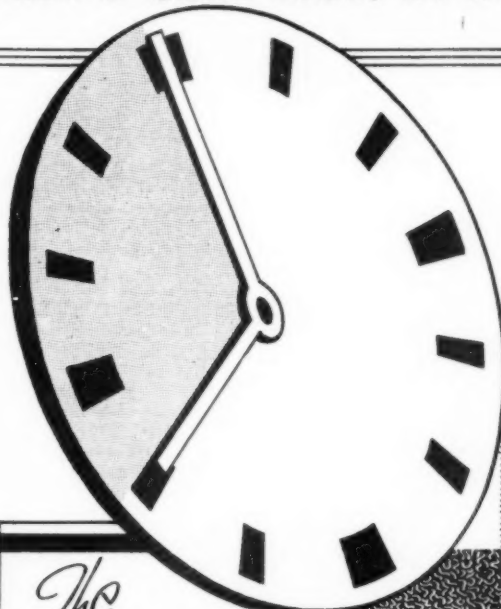
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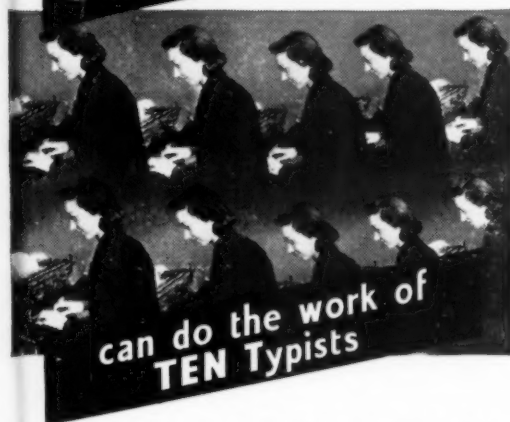
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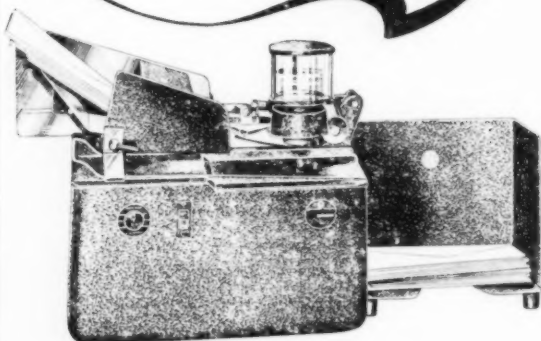
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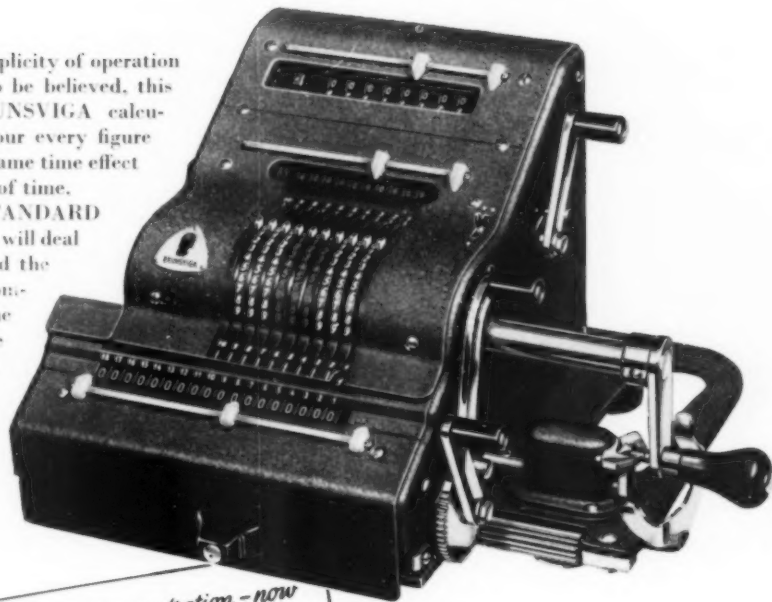
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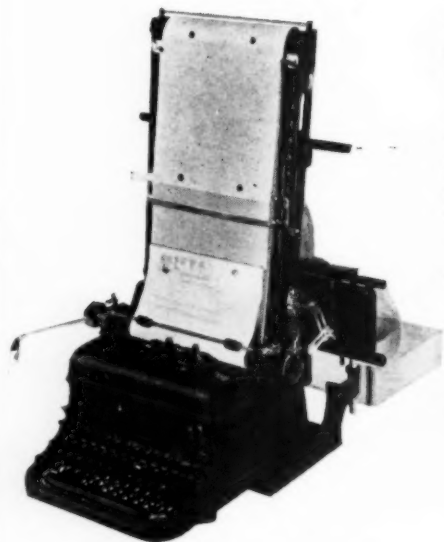
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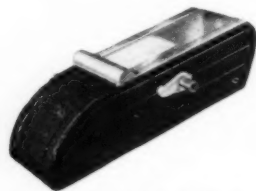
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The Journal of Management in Industry

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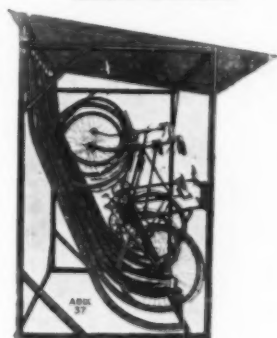
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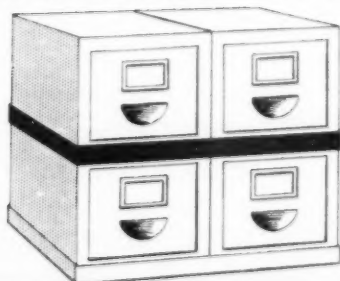
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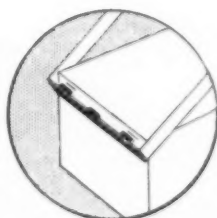
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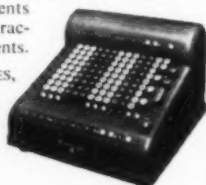
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The MARCH of BUSINESS

IT CAN NOW BE TOLD

JOURNALISTS are a pretty impatient lot. By temperament, and by the press of the job. To wait 12 months, therefore, before "it can now be told" calls for control almost past bearing. The more so, when every day may ruin the "scoop" nature of the story—and a grand story at that.

At last, in this issue, *BUSINESS* can reveal, for the first time, the details of an inspiring triumph of British management—the story of Patons & Baldwins' new £7,000,000 factory at Darlington.

The six special articles, all written by members of *BUSINESS* staff, involved many visits to the factory, dozen of interviews, hundreds of questions. *BUSINESS* thanks P. & B. directors and staff for their courtesy and patience, frankness and friendliness. Finally, let it be made absolutely clear that this is no paid-for "puff"; here is "pure," exciting news told for the benefit of all.

The cover photograph, specially taken by a *BUSINESS* photographer,

shows spinning frames in part of the new factory.

NO SOAP

LAATEST development in laundry operation is to dispense completely with soap and water. A new system uses white spirit instead, with a filter to extract from it the dirt which it extracts from the clothes. Better results are claimed than has hitherto been possible when using soap in the conventional type of cleaning machine.

The machine will clean cotton, woollens and silks in separate or mixed loads in a total process time of 15 minutes. There is no need to classify work either by colours or soiling, and efficiency is given as 56 per cent. cleaning and 0.6 per cent. greying.

Shrinkage tests taken on test pieces each processed 20 times using the new method against a conventional side-loading machine showed 0.1 per cent. warp and weft shrinkage for the white spirit and 9.7 per cent warp and 0.1 per cent. weft shrinkage for the conventional model.

Experiments showed that mechanical action is necessary for the removal of heavy soiling. A cylinder is therefore used in which the goods are opened out to present a maximum surface, at the same time being super-saturated with filtered spirit. After performing its solvent action through the goods, the white spirit leaves the cylinder and is filtered before being recirculated, so that the garments are never exposed to re-deposition of removed soil.

SUCCESSFUL large-scale distillation of sea-water at ninepence a ton to yield fresh water for boiler supplies and human consumption may revolutionize shipping and tropical economics.

The P. & O. liner 'Himalaya' has distilled 12,000 tons of sea water in a round voyage to Australia, giving 350 tons of pure drinking water a day more cheaply than it could be bought at tropical ports. Some 1,700 tons of cargo space were also made available for extra cargo. Invented by Mr. Sydney Smith, P. & O.'s superintending engineer, the new system is saving about

JUNIOR EXECUTIVES

Four of the many entertaining photographs of children, with brilliant captions by Nathaniel Gubbins, taken from "Fellow Citizens" which has just been published by Burke Publishing Co. Ltd., at 3/6 nett



"Got it. I'll turn myself into a limited company and pay myself directors' fees."



If you want to remain with us, Jones, remember our watchwords are Punctuality, Efficiency, Loyalty and Enthusiasm."



"Get cracking everybody. There's no such word as can't in this office."



"Somebody is chiselling on this board and I'm going to find who it is."

12

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£1,500 on a ten weeks' round voyage.

MARRIED WOMEN WORKERS

MANY businessmen would like to take on more married women to ease the labour shortage. Married women able and willing to work are, however, hard to find and even harder to keep.

In America, however, women regularly return to the factory after marriage and again after children. The reason, according to the Rigid Box and Carton productivity team, is that life is so much easier for the married woman in the U.S.A.

Most factories work from 7.30 a.m. to 4 p.m., with half an hour for lunch. Shops remain open until 8 p.m. and the large stores have one late closing day, when they remain open until 9 p.m. American housewives thus have few shopping problems.

The team recommends that "something be done" in this country to keep shops open at night to ease women workers' shopping problems. This is obviously a problem that can best be tackled at the local level; employers could approach local shopkeepers either directly, or through the local Chamber of Commerce.

An alternative, of course, is to modify shifts to meet the requirements of housewives. One firm, for instance, has recently introduced a special "mother's shift," which starts fifteen minutes after the local schools open and stops fifteen minutes before they close.

THE new order extending payment of purchase tax to firms and organizations printing their own stationery on office machinery (see page 37, February issue), has now been modified. The £250 exemption limit has been abolished.

The net result of this amendment is that firms are not now required to register for purchase tax, provided that,

(a) Purchase tax has been paid (where chargeable) on the paper used, and

(b) The stationery produced is intended solely for use in their own business.

The order has aroused consider-

APRIL, 1951

SALIENT FIGURES OF THE MONTH

"BUSINESS" INDICES

	Latest Month	Increase (+) or Decrease (-) Month Ago	Year Ago
Production (1946=100)	* 139.8	+ 0.5	+ 10.8
Purchasing Power do.	* 111.7	+ 0.4	+ 3.7

MANPOWER

Total manufacturing industries . . . (thousands)	* 3,620	+ 35	+ 247
Cotton spinning and weaving do.	* 33.3	+ 0.5	+ 7.3
Cool (on colliery books) . . do.	694	+ 4	+ 16
Reg. unemployed (U. K.) . . do.	366.6	+ 35.8	+ 37.3

PRODUCTION

Index of production (1946=100)	* 133	+ 13	+ 7
Cool (average weekly output) . . (thousand tons)	4,211	+ 68	+ 39
Steel ingots and castings (do.) . . do.	3.6	+ 10	+ 1
Cotton yarn (do.) . . (million lb)	* 15.22	+ 2.24	+ 3.13
Woven wool fabrics (do.) (million linear yards)	* 34.14	+ 8.70	+ 1.43
Passenger cars (do.) (thousands)	9.13	+ 0.26	+ 0.78
Commercial vehicles (do.) . . do.	4.31	+ 0.30	same
Permanent houses completed . . . do.	* 15.92	+ 1.50	+ 1.49

TRADE

Value of imports (£ millions)	297.7	+ 58.6	+ 95.4
Value of exports . . . do.	214.4	+ 25.5	+ 38.5
Freight train traffic (million tons)	5,535	+ 0.21	+ 0.19
Retail sales . . . (1947=100)	128	+ 54	+ 13

FINANCE

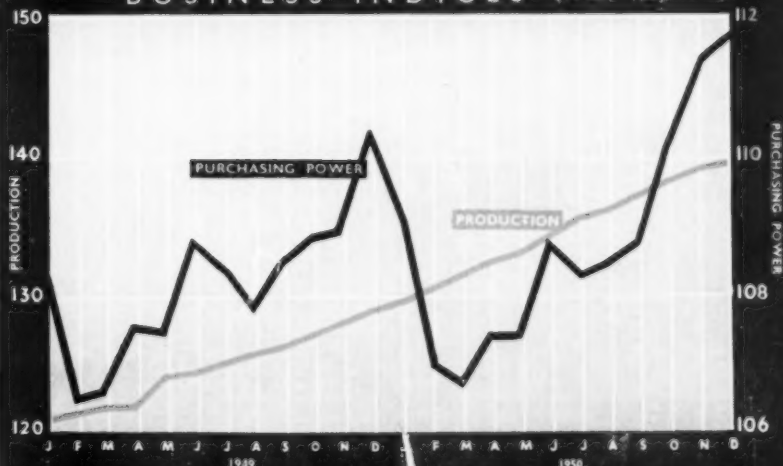
Currency in circulation (£ m.)	1,257	+ 32	+ 27
Deposits in London Clearing Banks . . . do.	6,262	+ 108	+ 175
Provincial cheque clearings (av. working day) . . do.	7.63	+ 0.17	+ 0.05

WAGES AND PRICES

Weekly wage rates (1947=100)	115	+ 1	+ 5
Retail prices (1947=100)	117	+ 1	+ 4
Wholesale prices (1930=100)	+ 305.6	+ 5.6	+ 60.5
Basic materials . . do.	+ 661.1	+ 35.1	+ 341.1
Intermediate . . do.	+ 353.8	+ 10.4	+ 76.2
Manufactures . . do.	+ 251.5	+ 4.1	+ 24.0
Import prices (1933=100)	* 1.0	+ 3	+ 8
Export prices . . do.	* 1.27	+ 2	+ 12

* December, 1950. + February, 1951. § Four weeks to January 2, 1951. All other figures refer to January, 1951.

"BUSINESS" INDICES (1946=100)



How to cut absenteeism



The main cause of lost time in industry, according to the Medical Research Council, is sickness absence. Much of this absenteeism can be traced to the transmission of contagious ailments through the use of communal towels. After washing, hands should be dried on a clean, fresh, fluff-free paper towel—an immaculate towel like Hi-Dri, designed to be used once, then thrown away!

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PAPER TOWELS

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Telephone: VICTORIA 1951/2

able criticism from industrial organizations in Parliament. Mr. Reader Harris, M.P., pointed out that most firms installed machinery of this type because they wanted work done quickly and in a particular way.

CAPITAL FLOWS TO U.K.

BBRITAIN'S dollar shortage has already brought a small flood of American capital to this country. U.S. firms, finding it impossible to export to Britain, set up their own factories in this country to supply their British customers. With the balancing of Anglo-American trade, any further flow might be considered superfluous. But if Britain is no longer desperately short of dollars, other countries still are, and it is still mutually convenient for Americans to make their products in Britain and sell to the world for sterling instead of dollars. So the flow continues.

Latest recruit to this Anglo-American co-operation in industry is the Independent Pneumatic Tool Company of Aurora, Chicago, which has acquired control of Armstrong Whitworth (Pneumatic Tools), Ltd., of Newcastle-on-Tyne. Both firms make similar types of pneumatic tools, and Independent have been represented in Britain for many years by a supply and service organization. But, as Mr. Neil C. Hurley, jr., president of Independent, says, "American firms

HOW THE CHART IS CALCULATED

The adjacent charts show developments in prices and sales of textile products.

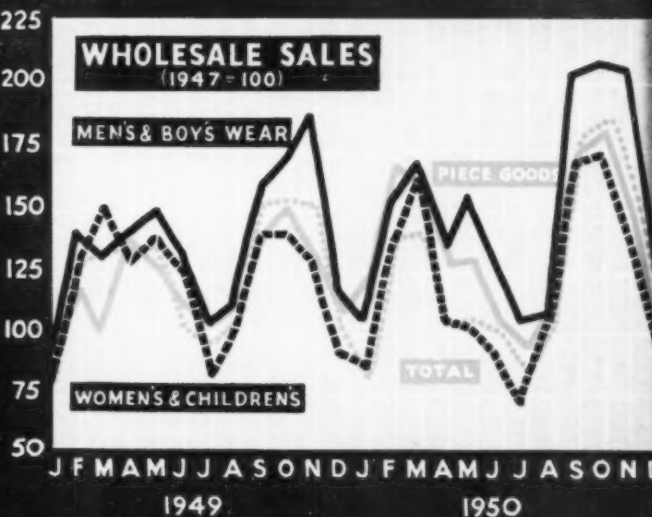
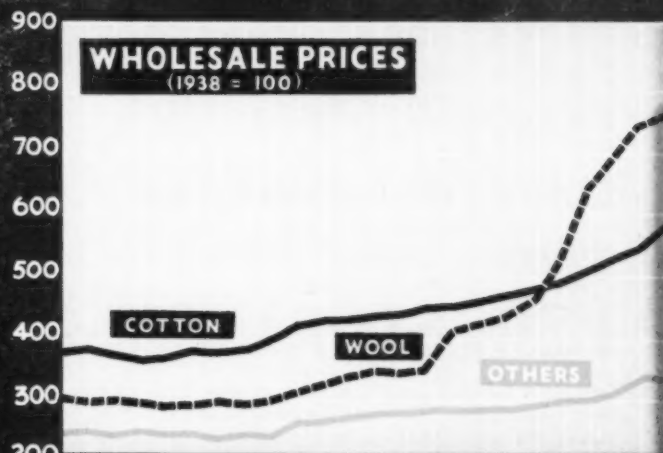
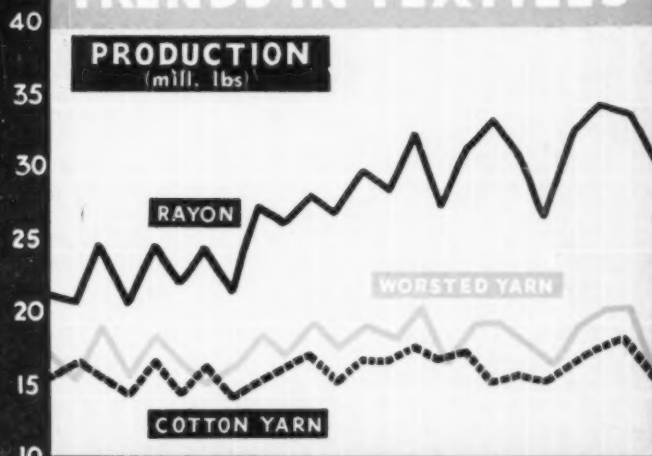
Production of single cotton yarn (excluding waste yarns), rayon (continuous filament yarn plus staple fibre) and worsted yarn (deliveries) are taken from Board of Trade statistics.

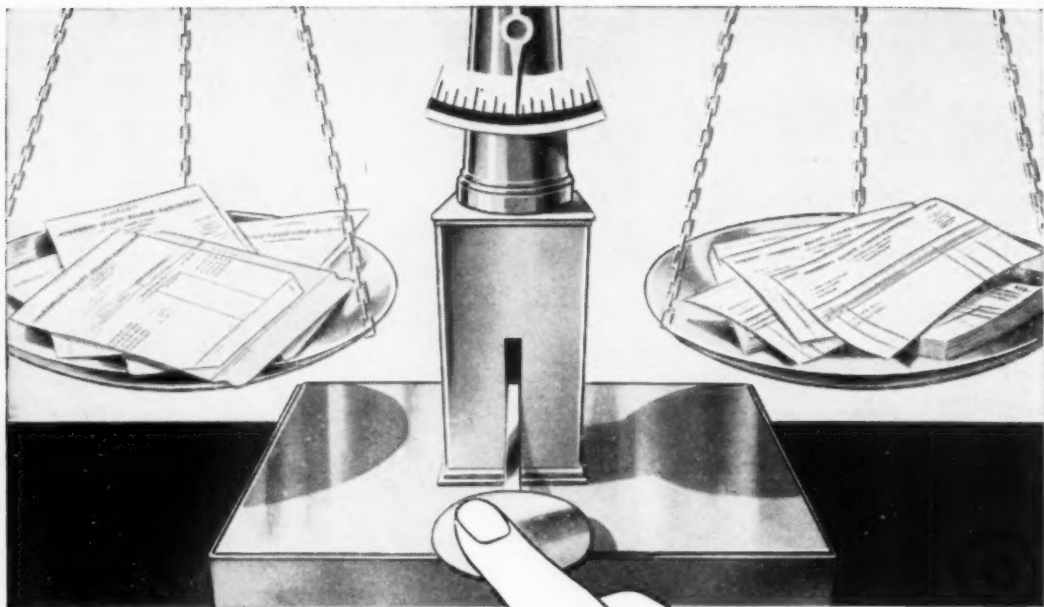
Prices are given in terms of the Board of Trade Wholesale Price Index (1938 = 100).

Sales are given in terms of the Index of sales of wholesale textile houses published by the Bank of England and the Wholesale Textile Association.

APRIL, 1951

TRENDS IN TEXTILES





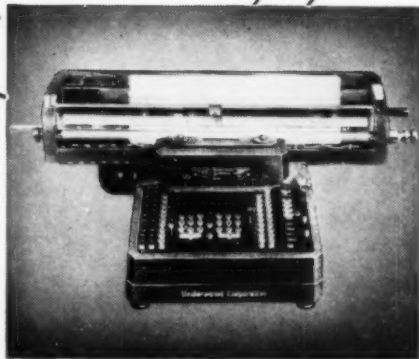
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desiring to do business on a large scale around the world simply have to maintain manufacturing facilities in both the dollar and sterling countries. Devaluation of the pound has upset a great deal of the United States foreign trading even in neutral markets such as South America."

USE of Very High Frequency radio for controlling taxi fleets (described in the February issue of *BUSINESS*) is making great strides abroad. Latest news is that all registered taxis in Copenhagen are to be equipped with radio telephones. Cruising cabs may thus be directed from head office to prospective fares, cutting out idle time and empty return journeys.

GETTING NEW WORKERS

THE shortage of new entrants to industry is focusing attention on the need for intelligent recruiting of apprentices. It is no good having an attractive apprenticeship training scheme if your potential apprentices do not know about it.

Many progressive firms now issue attractive handbooks, setting out these opportunities. The aircraft industry has gone one better. The Society of British Aircraft Constructors, Ltd., representing the entire industry, has issued *Your Future in Aircraft Engineering. A Guide for Boys and their Parents*. Well-written and profusely illustrated, it sets out just what a boy can get out of apprenticeship and how he can get it. And, finally, it lists 44 firms from whom he can get it. If this brochure gets widely distributed, there should be no shortage of apprentices in the aircraft industry in the next few years.

Another method of getting apprentices is to go father afield. The Brush-ABOE group of companies has just launched a scheme under which scholarships will be awarded to honour graduates from any part of the Commonwealth to enable them to complete apprenticeship training. A free return passage to England will be paid, with weekly wages during training at the standard graduate apprentice rate. This scheme, too, is described



In July, 1950, *BUSINESS* reported that the Klinger Manufacturing Co., Ltd. was opening a factory in a church at Margate. This factory is now in production. The building has been fitted with modern equipment, including loudspeakers for 'Music While You Work' (by Central Rediffusion Services, Ltd.) and fluorescent lighting.

in an attractive brochure that includes a history of the group and a description of its products.

THE introduction of a successful incentive bonus scheme at the British Reinforced Concrete Co., Ltd. was described in *BUSINESS* in February, 1950. The February, 1951, issue of "Target" contains a very brief description of the scheme in which it is stated that earnings rose between 1947 and 1950 by from 30s. to 46s. a week.

CONCERTED SELLING

THE function of the trade association is changing. The traditional uneasy union between competitors is giving way to a concerted sales effort.

Just how far the development has gone may be noted from the fact that at the 1951 Canadian International Trade Fair no fewer than seven industries will be represented by their trade associations

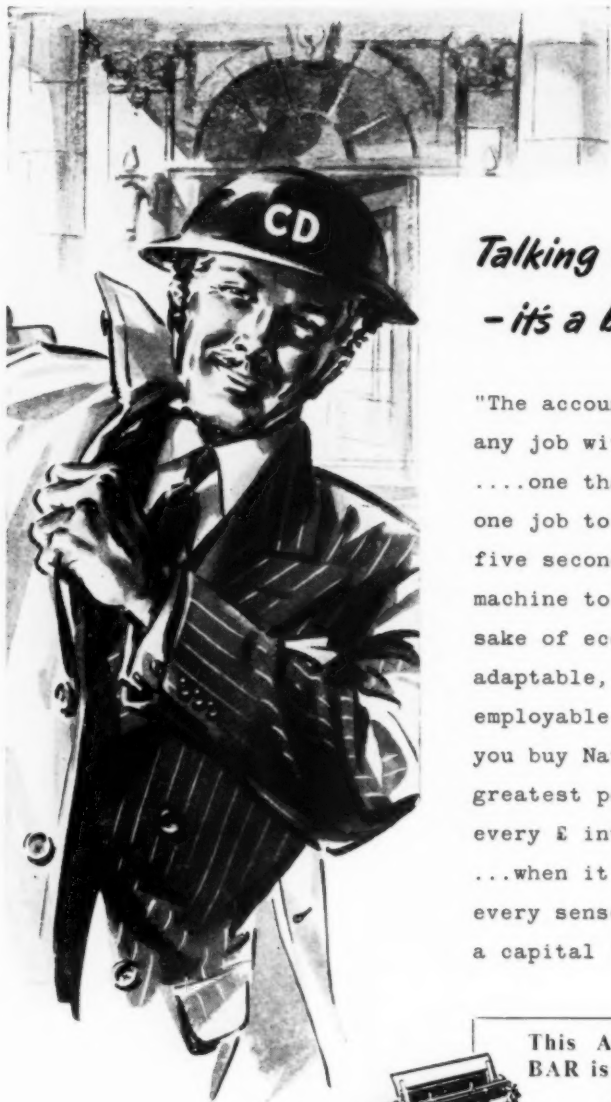
The initiative is to be welcomed. As a correspondent has pointed out, exhibitions of machine tools (to quote only one instance) have only been held at infrequent intervals during the last quarter of a century—in 1927, 1934 and 1949. The same industry in Belgium has since 1946 officially taken part in more than 30 machine tool shows and exhibitions in various countries. The soundness of this policy is reflected by the fact that to-day 80 per cent. of Belgian machine tool output is exported.

TO celebrate the 150th anniversary of the founding of the firm, the directors of Holman Bros., Ltd., Camborne, are offering a distinctive necktie to all who have completed an apprenticeship with the firm. All ex-apprentices, whether at home or overseas, are invited to make application in writing, giving dates and particulars of their service.

SAFER DEATH TRAP

IN the biography of Dr. Walter Rippner, managing director of Pest Control, Ltd. (*BUSINESS*, September, 1950), mention was made of the firm's new systemic insecticides. The active constituent of these chemicals is absorbed by the root of the plant and converted into a substance carried by the sap that, while non-poisonous to man, is death to insects. These new insecticides, while highly effective, have so far been extremely dangerous to handle, and their application has led in isolated instances to the death of farm labourers.

Pest Control have now solved this problem with a new product, called *Isopestox* because no one wants to use its proper name, bis isopropylaminefluorophosphine oxide. *Isopestox* is practically non-toxic, and can be safely handled by laymen. It is a true systemic, killing harmful insects and leaving the beneficial untouched. It is rapidly absorbed by the plant, and can thus be used within a fortnight of harvest. It will kill insects attacking such crops as lettuce, which cannot be reached by normal spraying methods. And it will kill certain insects that its predecessor left unharmed.



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A Triumph of British Management



A story of achievement is always worth telling for its own sake. When it also contains constructive ideas capable of wide application by top management, it is doubly worth recording.

Such is the story which begins on this page and which is continued in a series of articles in this issue.

Each article describes the "how" of achievement. Each presents a detailed picture of farsighted management in action.

This new factory is a blueprint for industrial progress

By ROBERT SPARK

ON the south bank of the Thames, on a site of 27 acres, there are nearing completion the buildings of the Festival of Britain. Among other things the Festival, is designed to show Britain's technical and scientific progress. Some 230 miles to the north of the Festival site there exists already an outstanding example of industrial progress which will still be setting a standard when 1951 is only a memory.

At Darlington, in County Durham, Patons & Baldwins Ltd. have built the largest plant for the manufacture of knitting wool in the world.

British industry is often accused of resting on its past reputation, of clinging to tradition and failing to keep abreast of the times. A

visit to Darlington shatters such criticism. Here is a factory which is outstanding, not merely because it is big—it has an area of 34 acres—but because it has been planned so expertly. *Here is a triumph of top management at its best*—combining new ideas with accumulated experience, and imagination with business realism.

First of all, why did Patons & Baldwins, already world famous, decide to wipe the slate clean and start afresh? Why did they decide to move from the traditional woollen areas and to group their entire worsted production capacity in England in a town which, though possessing one small woollen mill, is otherwise unconnected with the textile industry?

In 1939, Patons & Baldwins had

six worsted spinning factories located at Halifax, Wakefield, Leicester and Melton Mowbray. All these plants had been established many years—the Halifax branch, for instance, dates back to 1785. Although efficient, they were by no means satisfactory. They were located in fully developed areas which made it impossible to extend the premises except by the addition of further storeys or, alternatively, buying, at exorbitant cost, adjoining and fully developed land. Rebuilding on existing foundations would mean an extensive loss of production and general disorganization. Nor would it fully answer the problem.

Though the directors had kept existing buildings in the best possible condition, some of the build-

How it looks from the air

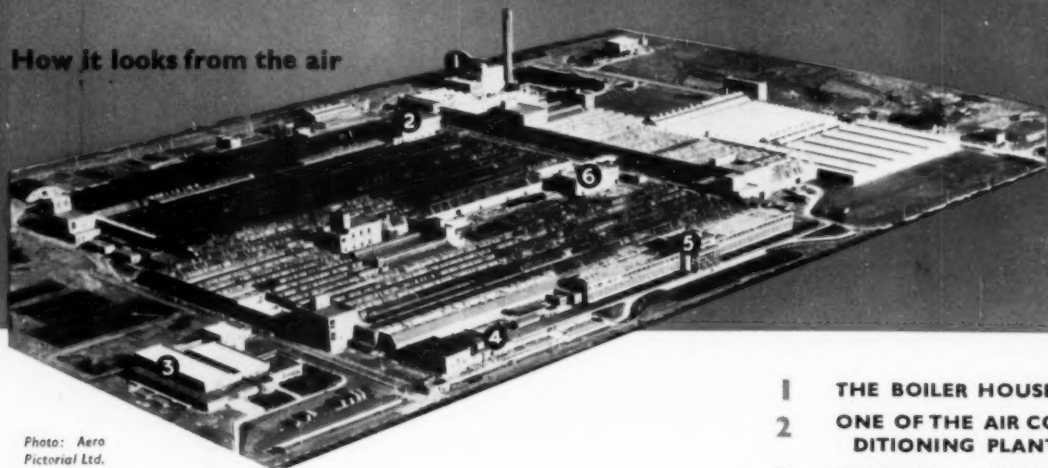


Photo: Aero Pictorial Ltd.

ings were more than 100 years old; they had been built in days when the standard length of a machine was much less than to-day. This ruled out the installation of the latest machinery and kept a brake on effective progress—machines had to be made to fit existing buildings rather than the reverse. Different floor levels meant excessive handling costs. Space limitations eliminated the efficient flow of materials throughout the various processes.

Human as well as material considerations were involved. The management of Patons & Baldwins have always striven to provide the best working conditions for employees. But improved amenities in the existing factory buildings could be installed only at great cost—if at all.

These and other factors in-

fluenced the board in their decision to make a change. The idea of moving the old factories to fresh sites in the same neighbourhood was investigated, but it was realised that this would only provide a partial solution, yet involve high capital costs. Processes such as dyeing and bleaching would still be duplicated and transfer and labour costs for the transport of materials would be involved. The capital employed in duplicated stocks of raw materials, finished goods and mill stores would still be much larger than if all the processes were carried out under one roof. *The ultimate economic solution lay in one large factory on one site.*

At the end of the last war the directors made their bold decision. They flung aside all old ideas and conventions and started on what, at that stage, could only be described

- 1 THE BOILER HOUSE.
- 2 ONE OF THE AIR CONDITIONING PLANTS.
- 3 CANTEN and SOCIAL CENTRE.
- 4 TRAINING, PERSONNEL and MEDICAL BLOCK.
- 5 ADMINISTRATION BUILDING.
- 6 THE LABORATORY

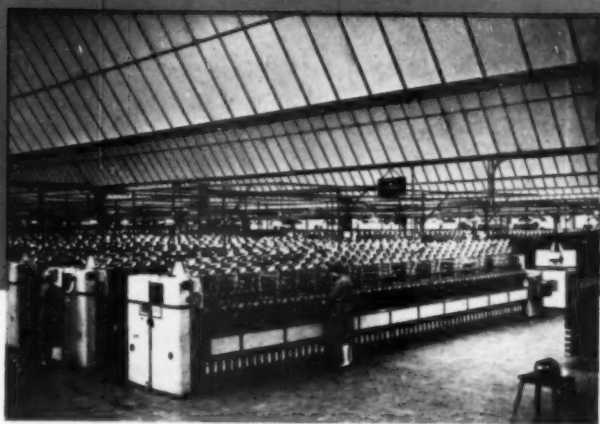
as an expensive experiment.

In their selection of a site they had first of all to be guided by the requirements of the Town and Country Planning Act. Availability of labour, road and rail access, essential services, accommodation for transferred employees and local transport facilities, had all to be considered. There had to be room for future extensions and reasonably level ground was of considerable importance if heavy construction costs were to be avoided. Many areas were inspected. Darlington was selected.

The approach to the design and layout of the proposed plant was new, and contrary to common practice. Before even the exact site was selected, a layout was approved which allowed for standardised machinery of the latest type, wide alleys and ample space for conveyors. One prime consideration was always before the directors—*there must be no reversal in the flow of material through the*

IN THE BOARDROOM. Three of the directors of Patons and Baldwins. Reading from left to right: Mr. J. S. Bullimore, Mr. P. A. Wright, the vice-chairman, and Mr. J. S. Kenyon.





INSIDE THE FACTORY. Above, part of a vast spinning shed. Machines in foreground are the revolutionary P.S.C. models which give increased output, are more automatic in operation, and need less labour to run. Right, a roving frame, which draws out the yarn prior to spinning.



plant Each process was arranged so that it would be a balanced and economic unit for supervision, and for obtaining maximum production per man hour.

This master plan was presented to the consulting engineers, who were asked to design buildings to fit it. The buildings had to be a cover and protection for the machinery layout, not the reverse, as is so often the case.

A site of 140 acres—almost half the area of Hyde Park—was obtained on the eastern outskirts of Darlington, of which 34 acres were allotted to factory buildings and 50 acres for sports grounds. The balance was available for future development. The entire factory was to be single storey, with the exception of the administration block—the offices forming the second floor. In this way it would be cheaper to build; the flow of materials would be simplified; mechanical handling would be easier; and humidification and ventilation problems fewer.

Work was commenced on the factory in January, 1946, and by December, 1947, a small section was in production. By December, 1949, 22 acres of buildings had been

handed over by the contractors. Today the bulk of the plant is in productive use—only a relatively small proportion of the total building area is incomplete.

Seeing it for the first time it is difficult to find words which give an accurate and overall impression of its immensity. Superlatives are tedious, but one cannot avoid them when looking at the 540ft. long administrative block, or standing in one of the "sheds," which are over a third of a mile long and cover an area of 13 acres. Yet it is big because it needs to be big. Here is efficiency—and space for efficiency. In such surroundings productivity can flourish.

The two most important factors taken into account when planning the factory were mechanical handling and atmospheric control. Top management firmly believes that everything possible should be done to reduce physical effort by the operative and to eliminate indirect labour, thus ensuring high manpower output. Movement of materials from bin to truck and then into another bin is, in the words of the vice-chairman, "simply a waste of manpower and money."

The vast area of the sheds made an efficient handling system essential. The result was something new in conveying. All double handling of materials is eliminated. The trucks using the conveyor system are "bins on wheels." Cross traffic in the factory is not impeded in any way, as all the motive parts are below ground. The conveyor system—as is described in detail on page 66—consists of 13 circuits, varying in length from 380ft. to over 2,000ft. Equipment is easy to maintain. Patons & Baldwins believe in simplicity.

Another example of thorough investigation into the problem of mechanical handling is found in the sorting shed. When it was first learnt that an attempt was to be made at Darlington to mechanise this department, the sceptics were inclined to smile; it was said that far too little experimenting in the mechanical aspect of this and other industrial processes had been carried out.

The sceptics have been confounded. After much thought a system featuring belt conveyors was successfully installed. Handling between the sorting benches and blending bins, and from thence



to the scouring, carding and combing sections, has been cut down to a minimum. Where the wool can not be conveyed, air suction is used. For instance, wool after scouring is sucked automatically to any one of the hoppers which feed the 44 carding machines.

Atmospheric control—the other important feature of the factory—includes heating, ventilation, humidifying and air filtration. In addition to providing satisfactory working conditions, air treatment is necessary in the various stages of

Back-washing to remove dust after carding and to condition wool for further processing.

wool manufacture. With the exception of the wool warehouse, all the buildings are air conditioned, the required treatment being carried out in eight plant rooms. These rooms "handle" fresh air, which is mixed with air fit to re-use—air which is too dirty being "thrown away." The mixture—which can be fixed at any percentage—is drawn through a washer where it is brushed and filtered through a fine wire mesh, washed with hundreds of sprays and finally passed into a heating battery. Electrically driven fans discharge the air into aluminium distribution

ducts, whence it enters the factory.

The total conditioned area in the factory is 23 million cubic feet, and the volume of air handled by the conditioning equipment is 1,873,000 cubic feet per minute. The relative degree of humidity in each section of the factory is maintained to suit the particular conditions desired, and since it is part of the control of atmospheric conditions, it is automatically controlled and the plant can be set to give any required conditions within limits.

Mechanical handling and air conditioning do not by any means provide the only instances of Patons & Baldwins' attention to detail. New ideas and equipment abound everywhere. Take, for example, the boiler house, which produces steam for various processes and electricity for the power load. Coal wagons are automatically emptied and their contents conveyed either to coal bunkers at the top of the boiler house or to the adjacent coal yard. The bunkers feed the four Yarrow tubular boilers, each capable of evaporating 62,000 lb. of water per hour into steam. This steam is delivered to three back pressure turbines connected to 1,750 kw. generators, which supply part of the electricity load. After the steam has passed through the turbines it is used for process work; thus nothing is wasted. This plant is worked by one engineer and three men per shift, against five engineers and 12 men on the plants closed down

Why they moved . . .

1. Existing factories could only be expanded vertically with consequent production flow problems.
2. The old factories were not designed for modern machines.
3. Several plants meant duplication of processes and stocks, and tied up capital.
4. Multi-storey premises stop the most effective use of mechanical handling equipment, waste labour on non-productive jobs.

6 Management Ideas

- 1 Pool new ideas with accumulated experience.
- 2 If factories are in fully developed areas look elsewhere and centralize—even if it means moving to a non-traditional area. Don't compromise.
- 3 Plan the factory layout and work-flow first, then the factory buildings—not the other way round.
- 4 Analyse every job and check any means of cutting non-productive tasks.
- 5 Use mechanical handling equipment to the limit. Investigate what is available, whether it lifts, stacks or carries.
- 6 Plan a training scheme for dealing with "green" labour in the new area.

... and how they benefited

1. All on one level factory aids materials movement, cuts costs.
2. Large "sheds" allow flexibility of layout and use of most modern equipment.
3. Local labour can be trained to do a job the best way and has no "inherited" prejudices.
4. New factory in a new area allows room for future expansion.

The degree of automaticity is still not, however, exhausted, as the ash from the furnaces is dropped into a water tank, finally coming to rest on a moving belt which transports it out of the building into railway wagons. To handle incoming and outgoing wagons the company use a fireless locomotive. This receives a "charge" of steam from the main boilers, and is simply re-charged whenever it is required. This again is an example of how waste of time and labour has been avoided.

Each department has some unusual feature, some departure from the traditional. In the 960ft. long combing shed there are 44 carding machines set out in a single row. Yet one man can feed 24 of them with wool quite satisfactorily—only a fraction of the manpower used in the more conventional type of mill. In the scouring sheds soap and alkali are prepared in tanks and pumped in exactly the right mixture and at the right temperature to supply points over the scouring machines. All the operator has to do is to twist a valve to feed in the requisite amount.

Combing machines are also in one line—40 of them. They are sited over a "noil cellar." Noils are the short fibres which are rejected. They drop through holes in the floor into bins, whence they are eventually blown to the noil packing plant. Only one man is needed to clear the noils from the cellar and despatch them to the packing plant.

How shipping space on export orders is saved. Parcels are compressed to less than half their original size and packed at the same time. The ram works upwards from the floor to allow the packer to work at a convenient height.

Lighting has also received the attention of top management and exhaustive tests between fluorescent and filament methods were carried out, the results being in favour of the filament method. The capital cost of installing fluorescent lighting would have been double that of the filament method and the maintenance charges some 80 per cent. higher. On the other hand the units consumed by filament lighting are double those of fluorescent.

Taking the annual costs as a whole, including capital charges, the results proved that filament lighting was better. The directors did not think that fluorescent lighting would result in any higher output in the factory. But they were farsighted enough to arrange that wiring was so designed that at a later date it would be a simple matter to change over to fluorescent lighting if desired. An exception to the rule has been the installation of fluorescent lighting in the reeling and winding sections, where more concentrated light was required.

Many of the spinning machines



are new Prince Smith's Centrifugal models, which embody a number of revolutionary features. Patons & Baldwins have been associated with the manufacturers of these machines—Prince Smith & Stells—from the outset, and a prototype was installed at Darlington early in 1948. A stable design and

Continued on page 82

How they train workers...



Management breaks with tradition



Drawing their labour largely from women and girls who have never before worked in a textile factory, Patons & Baldwins have been able to introduce scientific training methods and scotch the old tradition of "inherited skill". Workers are not only trained in the operation of machines but in the organization of their job. This system of training led to improvements in manufacturing methods—with a further rise in productivity.

How they trained "green" labour in a skilled job

By the EDITOR of "BUSINESS"

WHEN Patons & Baldwins moved to Darlington, they were given an opportunity on the personnel management side such as many a harassed industrialist has ardently dreamed of.

Admittedly they had to recruit and train from scratch an entire new labour force of men and women. But these new workers were completely untrammelled by the traditions and prejudices of older staff in the textile industries. New machinery and new methods of work could be introduced with a minimum of resistance, and operated with a flexibility impossible in an older factory. The almost ideal working conditions offered by the new buildings and equipment could result in a tremendous improvement in efficiency and productivity as compared with factories in the older textile centres.

Recruiting of labour brought little difficulty. There was in 1946 a considerable surplus of female workers, many of them from the

Tees-side area where there are few opportunities for women. Some of them, it is true, had to be brought to Darlington from nearby towns and villages, but this, in the days of motor transport, was not an insuperable difficulty, and a fleet of buses is chartered for the purpose.

School leavers offer a steady supply of new labour that is currently well in excess of wastage, and is likely to remain so for some time. Thanks to a well-organized programme of lectures and film shows provided for schoolchildren, Patons & Baldwins are at present taking over 30 per cent. of the girls leaving local schools. Some 25 per cent. of the total intake are under 18 years of age.

The total labour force is now over 2,000 and will be brought up to 2,800 before active recruiting in excess of wastage is completed. Women predominate in the proportion of three to one.

Apart from a few key workers brought from other mills, the

whole of the labour force is completely "green." Many of the older workers are married women, most have had no previous experience of factory life. All lack the "inherited skill" of which so much has been heard in the textile industries.

Patons & Baldwins have always been a little sceptical of this alleged inheritance; having trained a heterogeneous collection of girls and women to a point where the best of them, after a maximum of three years' experience, can compete in output with any West Riding operative, they feel that they have finally scotched it.

Induction training is no novelty in progressive businesses, but Patons & Baldwins' circumstances called for special attention to its development. Not only were the new workers coming to a new factory; they were coming to what was, for Darlington, a new firm and a new industry. The myriad social contacts whereby a new worker may get some idea of what is in store for him did not exist.

For this reason, the firm lay great stress on accepting new workers in groups. They found that the first question a potential worker asked was, "Shall I be the only one?" In facing the unknown perils of a strange new job, there is apparently safety in numbers.

Engagement of workers in groups is facilitated by a system under which the personnel officer holds periodic meetings at which department heads make requests for additional labour for different jobs. From these figures, the personnel department plans further intakes in advance, and engages the required workers in groups which, at the moment, average from 30 to 40 each fortnight.

Induction Course

NEW workers spend part of their first week on an induction course. This consists of two lectures a day, and starts with a description of processes from raw wool to finished product. A conducted tour of the factory follows, so that practice can be studied as well as theory.

Other lectures include the pay packet and how it is made up (including the holidays with pay scheme); factory health; safety; the importance of quality; the organization of the factory, indicating leading personalities whom employees should know by name and function and, eventually, by sight; employee services and the personnel policy of the management; and rules and customs.

Each worker is thus given a background against which she can fit her own task. At the same time, an atmosphere is built up that is an important factor in a new factory, where traditions and customs are only beginning to be established.

On commencing employment the employees start a five-week training course, and in the development of this work Patons & Baldwins have broken completely new ground.

The impetus came from many sources. It was born in the hectic

period immediately after the war, when industry was breasting the difficult transition from war to peace. Conditions were fluid, the moment was ripe for innovation.

First came the application of job analysis to operations in worsted spinning. Some of the overlookers from the Yorkshire and Leicestershire factories went through a Training Within Industry course and came back to break down the traditional processes of spinning and twisting into a series of simple elements that could be taught successively to completely unskilled workers. *Process by process, a series of job breakdown sheets were prepared, describing in their proper order the separate unit operations necessary to complete each process.* These operation sheets then became the basis of a training manual or method.

There was an important by-product of this job analysis. Most of the processes were carried out by techniques that had passed, unquestioned, from one generation of workers to the next. In the meantime, working conditions had altered, machinery had been modified and

improved, without much thought being given to the methods adopted by the operative in using it. When these methods came to be written down in cold print and appraised with a critical eye, crudities were shown up that led immediately and inevitably to an improvement in methods. In certain cases, too, it was found that a minor modification of method, of no technical importance, would simplify training.

An immense amount of this work was done while the Darlington factory was still only a blueprint. By the time the first batch of labour could be taken on, trained overlookers and women trainers were available from the Yorkshire and Leicestershire factories to put the new methods into operation.

As more and more workers were taken on, the overlookers became increasingly absorbed in the day-to-day administration of their departments, and the women trainers took over completely. Some of the earliest workers to be trained by them became trainers in their turn. To-day a corps of

Continued on page



9 Points for Management

- 1 Take on labour in groups, not singly.
- 2 Plan labour intake well in advance.
- 3 Give new workers background information.
- 4 Break down jobs into simple elements.
- 5 Remedy shortcomings revealed by this analysis.
- 6 Train workers in each element in its proper order before going on to the next.
- 7 Train workers in the organisation of the job, as well as in individual elements.
- 8 Provide satisfactory incentives to efficiency.
- 9 Give promising workers opportunity for training as supervisors.



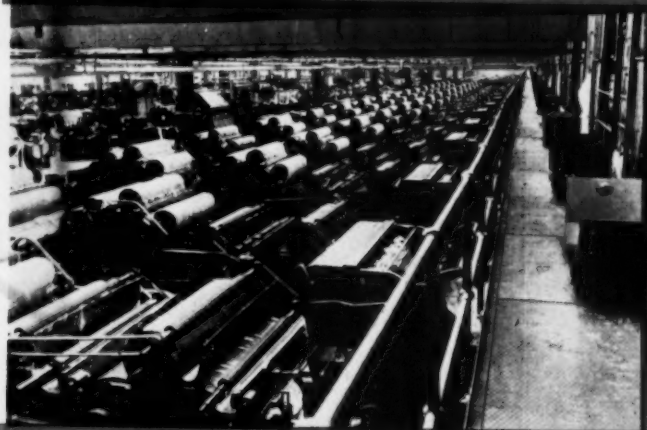
1 Wool sorters at work behind the specially designed "dunks". Graded raw wool is placed on the central trough conveyor.



4 One of the dyeing vats. Wool is placed in net sacks, lowered into the vat and the top plate seen in the picture is lowered on top of them.



2 One of the batteries of machines for scouring raw wool. The wool passes through washing solutions and a drying oven and is sucked through ducting to carding machine hoppers.



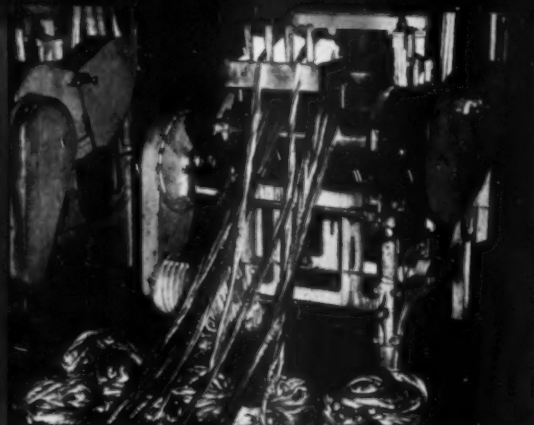
3 The impressive line of 44 carding machines, which stretch for a third of a mile. Hoppers containing wool are on the extreme right.



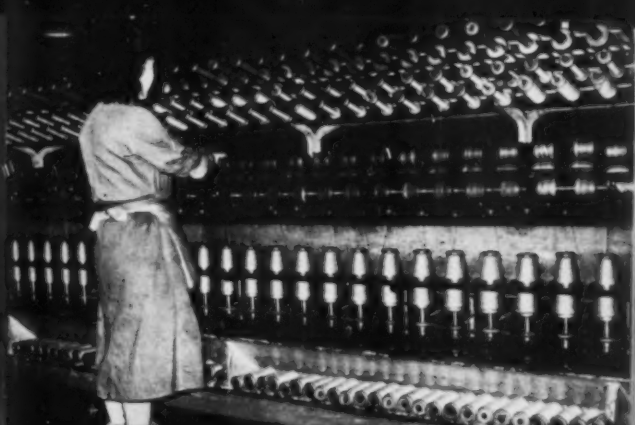
5 Another view of one of the vats with the top plate lowered and the wool in the course of the dyeing process.

Inside a £7,000,000

The 34-acre £7,000,000 Pabon features never before applied processes previously hand of bling the plant to produce 1



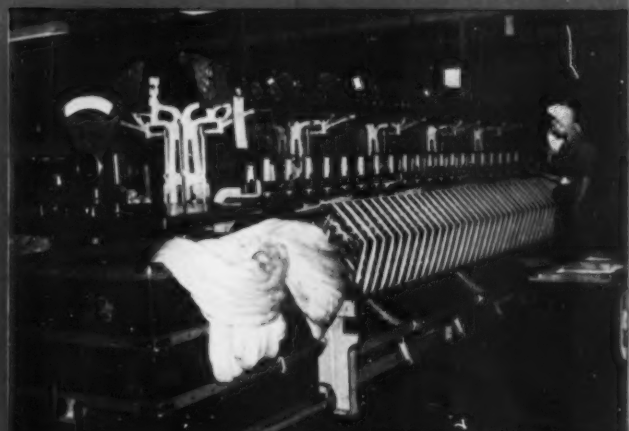
6 Mixed wool of two colours undergoing the first drawing operation. The machine is a two-can Gill Box.



8 One of the many ring twisting machines, which twists several strands of wool to make two, three or four-ply yarn as required.

10,000 factory

Baldwins factory incorporates the worsted spinning. Numerous operations have been mechanized, enabling the factory to produce 10,000 lb. of knitting wool a year.



9 Operation reeling. Here wool is removed from bobbins and wound in uniform skeins. Weighing machine on the left is one of many used throughout the factory.



7 A standard cap spinning machine in operation. Note the elevated electric driving motors seen on the left in the picture.



10 The storage and packing section of the factory. Completed packages are taken to the despatching bank by moving band conveyor.



He built up a £400,000 business in ten years

By PHILIP F. DYER

IN an age hamstrung by rules and regulations, state control and private monopoly, prohibitions and restrictive practices, the field open to individual initiative and enterprise is limited. The days when a young man could pull himself up into affluence by his own bootstraps have gone for ever. So it is argued—with some justification. But such arguments are never the whole story. If it is true that the prizes have become harder to win, they are still there for the getting.

Consider the case of George Carter. As a young man of 30, he started a business on his own in 1940—and had to get a licence to do it. Since then he has never been free from controls. Yet in the short space of ten years he has built up a private fortune of £250,000 and retains a considerable share in the business that employs him as managing director at £5,000 a year.

Born in Halifax in 1909, George Carter left school to join the local firm of Wm. Asquith, Ltd., machine tool manufacturers, as an apprentice. His indenture, however, was

unusual, if not unique. For he went, not as an engineering apprentice, but as an apprentice in management; during the four years of his apprenticeship, he worked steadily through practically every department, learning such subjects as accounting, office management, buying, costing, production control and selling. It was a liberal education, in a progressive firm, one of the first in Halifax, for instance, to introduce accounting machines and punched cards.

George Carter prospered; at 19, he was chief cost clerk, with some 12 other juniors under him. But in 1931 came the depression, and the machine tool industry was the first to suffer. Carter found himself out of a job. He was not perturbed. He looked at the local evening paper, and saw that a civil engineering firm constructing reservoirs up in the moors behind Halifax were advertising for costing staff. Next morning he was up by 5 a.m., and by hard walking arrived at the site before the agent. When the agent arrived at 9 a.m., Carter was waiting for him. "What d'you

In spite of government controls, George Carter has built up a business that, launched with an initial capital of only £500 in 1940, was recently sold to an investment trust for £400,000. Beginning from machine tools, Carter branched out in 1946 with a new washing machine, and is now selling 550 a week. The new re-armament drive has sent him back to expand output of machine tools.

want?" asked the agent. "That job you advertised," answered Carter. "But I haven't opened my post yet!" protested the agent. George Carter got the job.

When the reservoirs were finished, George Carter started his travels. After a short period with Crompton Parkinson he went as chief cost clerk to the Express Lift Co., Ltd., and stayed with them until 1935. Then the call of Halifax and of the machine tool trade was heard again, and he joined Kitchen & Wade, Ltd., as



secretary, later becoming a junior director.

As part of his work in this capacity, he had to keep an eye on imports of machine tools, particularly from the United States. The size of these imports continually worried him, but what seemed even worse was the fact that so many of the tools consisted not of elaborate special-purpose tools, which might conceivably be the product of superior American "know how," but what George Carter terms "simple stuff that any fool could make."

By 1940, George Carter had decided that he could make some of this simple stuff. He resigned from Kitchen & Wade, and, with a chartered accountant friend, Kenneth Howarth, and another man set up the Ajax Machine Tool Co., Ltd., with an initial paid-up capital of £500. This was only just enough to pay for primary expenses and the first load of castings for a batch of drills. It was certainly not enough to buy machinery as well.

But Halifax is full of textile firms with sizeable engineering departments to maintain their looms, and with the textile industry in the throes of war-time concentration, these were sadly underworked. They were only too glad to undertake the machining of George Carter's castings on a sub-contract basis. When the first batch of new tools were assembled, they were not sold, but put on the production line to produce more tools. Soon there was a small but steady

Aluminium sheets are bent (left) to form the shell of the washer and riveted (right) in a jig to a rigid framework.



The complete body is then dipped in a series of solutions to prepare the surface for painting.

trickle of drills coming out of the new West Mount works.

Then came trouble. This was the time of the "phoney" war and the Maginot Line. The Whitehall machine was all geared up—and was seizing into a state of bureaucracy. To manufacture machine tools—or practically anything else—one had to have a licence. George Carter applied for a licence—and was refused. There was, he was told, no demand for such tools that could not be met from existing sources of supply. George Carter went on making drills. In due course, a sharp note reached him from the Ministry, informing him that he was making machine tools without a licence, that this was an offence under the Defence

Regulations, and that he must desist immediately. The position seemed gloomy, to say the least.

But in the same week, the engineering trade journals carried a full-page advertisement, reproducing in facsimile handwriting a letter from Mr. Herbert Morrison, then Minister of Supply. This called attention to the acute shortage of machine tools, and ended up with an appeal, "If you know of a machine tool that is not being used, or is only being partially used, please write to me personally."

George Carter took the hint. He set up the last batch of drills off the production line, got a local photographer to take a picture of them, and wrote to Mr. Morrison in his own hand, saying, "Here are

36 brand new drills that are not being used. They are not being used because the Machine Tool Division of the Ministry of Supply will not let me sell them." Three days later he received a telegram from the Ministry: "Despatch 12 1-in. drills to Messrs. Blank. Contract following." The contract duly followed. So did the licence. And so did a regular series of further contracts. George Carter was on his feet.

Finding A New Product

War-time progress of the firm, if steady, was not spectacular. By 1944, profits had reached £4,398, but of this £2,946 was taken by taxation—the firm had no E.P.T. standard. Then armament orders began to slacken off, and it became obvious that some new activity would have to be taken on if the firm were to continue, let alone expand.

George Carter decided that there would be a vast post-war market for a washing machine, and set to work to design one that would suit it. A last-minute order for gear-box cases for the Churchill tank tided him over the transition period, and he managed to obtain a small quantity of aluminium from the Ministry of Aircraft Production for research and development work. In April, 1944, the Ajax Domestic Appliance Co. Ltd. was

born as a wholly-owned subsidiary of the company, and the ADA (from the company's initials) washing machine came into being.

Preparatory tooling-up and organization took some time, but active production started in 1945; in 1945-6 (the company's year ends on April 30) output was 964 machines, and this rose by leaps and bounds to 3,321 in 1946-7, 6,863 in 1947-8, 8,526 in 1948-9 and 15,310 in 1949-50. Output at the time of the imposition of restrictions on the use of metals was at the rate of 24,000 a year, and plans were on hand for doubling this. These have,

of course, now had to be postponed, but even with current restrictions George Carter hopes to be able to maintain a steady output of 21,000 machines a year.

Production Meant Profits

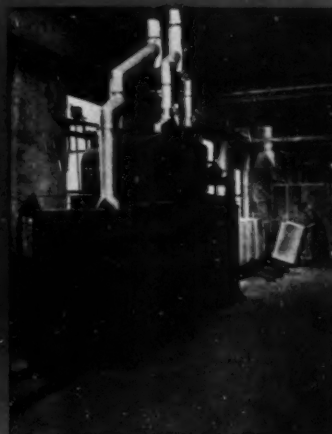
Profits followed production. From about £3,000 a year in the years 1944-6, they rose to £6,051 in 1946-7, £18,723 in 1947-8, £51,977 in 1948-9 and £126,480 in 1949-50. Last December, the firm was converted into a public company, the Aurochs Investment Trust paying £400,000 for the share capital, of which George Carter personally received £240,000: he stays as managing director at £5,000, plus a percentage of profits over £150,000 a year. He also retains a fairly substantial shareholding in the investment trust.

George Carter's foresight has thus been proved in a very practical manner: there was a market for a washing machine. There is, however, more to it than that; there are half a dozen other washing machines on the market, and George Carter has had to fight for his position in it.

The Ada has no particularly outstanding advantage over its competitors in appearance, performance or price; it is technically a



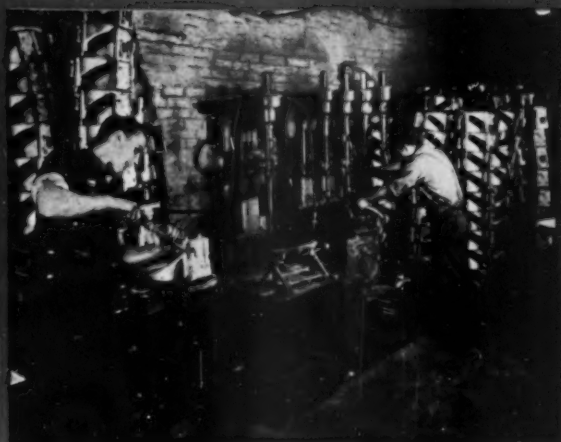
The body is spray-painted in a booth in which a cascade of water absorbs the surplus paint.



The cabinets are stored in an automatically controlled gas furnace.

6 POINTS FOR MANAGEMENT

- 1 Refuse to recognise restrictive practices.**
- 2 Work round the clock.**
- 3 Train green labour on single jobs.**
- 4 Pay high incentives to efficient labour.**
- 5 Get rid of duds.**
- 6 Give dealers restricted franchise and incentives to sell hard.**



Standard machine tool units are mounted in conjunction with jigs to simulate special purpose tools at a fraction of the cost.



Assembly of the mechanism of the washer is carried out by unskilled labour trained on a specific job and paid by piece-rate.

sound, workmanlike, well-designed job that would grace any kitchen—but so are its rivals. If you ask George Carter his secret, he answers simply: "I've got the production."

One reason for this is his original choice of aluminium as the material for his washing machine. At that time, aluminium was, pound for pound, eight times as expensive as sheet steel, and its use as a substitute seemed ridiculous. But by careful costing, taking into account differences of weight, workability, handling and so on, Carter found that there was, in the final result, very little in it between the two metals.

Aluminium, moreover, was readily available, while the sheet steel position was—as it has always been—decidedly "sticky." Today aluminium is as hard to get as steel, but the limited supplies available are naturally going to established users, so that Carter retains his initial lead. Certainly he has never had serious hold-ups because of lack of raw materials.

But the main reason for Carter's success in getting his production has been his almost cavalier solution of present-day management problems. This would not have been possible save for the fact that he has always insisted that his factory is a non-union shop. He has

no objection to his workers joining a trade union if they wish, but he refuses to recognize any union as a negotiating body on either wages or conditions of work. As a result, he has managed to avoid the restrictive practices that bedevil British industry to-day.

He has, for instance, managed to obtain round-the-clock working for six days a week. The morning shift come on at 7.30 a.m., work the day at a basic rate followed by evening overtime (with meal breaks), and clock off at 7.30 p.m., to be replaced by a night shift working on a similar basis until 7.30 a.m. next morning. On Sundays a maintenance crew take over.

Flexibility is the Key

There is no nonsense, too, about demarcation; any worker may be called upon to do any job in the factory—and is glad to do so. Many of them operate two or three machines simultaneously, loading and unloading one during the traverse of the other.

He has thus achieved a flexibility of operations that has enabled him to weather the constantly changing conditions of a troubled post-war period.

This flexibility is fostered by Carter's recruitment and training

policy. Practically all labour is, in the accepted sense of the term, unskilled; there are only some 30 to 40 workers who would be recognized by a trade union as skilled men. Labour is recruited from a variety of sources—present employees consist of men from many walks of life, most of them in the late twenties or thirties. No boys are taken on—"they are only a nuisance in this type of factory."

When a man applies for a job, he is taken on as a labourer, and spends his first few months cleaning or fetching and carrying. If he proves a good worker he is promoted to a machine and taught how to operate it. If he fails to make his target after a month or so he is sacked. When he has mastered one operation, he is switched to another. Finally he may be promoted to progress chaser.

This policy pays. In the recent 'flu epidemic, for instance, a considerable number of workers were off sick. By day-to-day rearrangements of operating duties as the occasion arose, by getting workers normally on a single machine to take on two temporarily, even at the expense of faulty co-ordination, and by bringing back progress chasers and foremen as operators, the crisis was weathered without any real loss of production.

If George Carter makes great

demands on his workers, he gives equally great rewards. He believes wholeheartedly in the incentive value of the heavy pay packet. All payment is on a piece-work basis, or, on assembly jobs, on a group piece-rate. A time is fixed for the job and the union standard rate paid, but the bonus paid to workers who beat the time is passed on to them *in toto*, and is limited only by their capacity to earn it. The result is that unskilled workers are regularly carrying home a pay packet of nearly £20 a week.

The net result is surprising. In spite of the arduous working demands he makes upon his men, George Carter has never been short of labour; at the moment he has a long waiting list of applicants for jobs, and other employers of labour in Halifax tend to look at him askance. Inside the factory, the work is done expeditiously and cheerfully, with an unusual combination of happy atmosphere and hard work.

Cutting Capital Costs

Not unexpectedly, the Ajax Domestic Appliance Co., Ltd., make considerable use of the products of the Ajax Machine Tool Co. Ltd. In particular, use has been made of a utility head stock that can be attached to standard machines such as a centre lathe and a lathe converter to enable a wide variety of operations, such as milling, cutting, and grinding to be done. These head stocks are mounted singly or in series to give what is in effect a special purpose machine, without the heavy investment needed for purchasing a specially constructed machine. By ingenious adaptation of standard machines, capital outlay on plant has been successfully kept down to a very low figure.

A very extensive use is made at every stage of assembly of jigs and fixtures, produced in Ajax' own toolroom. All drilling of panels, riveting, etc., is carried out with pneumatic power tools, while intelligent planning of layout has reduced mechanical handling to a



The final assembly of the mechanism and motor in the washer.

point at which no equipment is needed to handle the product.

With his costing background, one would expect George Carter to demand a complicated standard costing system; but he has seen too many complicated systems that cost more to install and operate than they saved. He believes in keeping his costing simple. Labour costs and material costs, he says, can look after themselves; the important item to watch is fixed expenses. It is only by preventing fixed expenses from rising *pro rata* with variable that he has been enabled to show the profit record he has, since the whole of the savings in cost secured by extra output is passed to the workers.

Rearmament, and the restrictions of the use of metals, has brought a check to Ada's expansion. It has not deterred George Carter's expansion. If he cannot make more washing machines, he can make more machine tools, for which there is a crying demand.

George Carter is caustic about the current delivery dates being offered, and the way in which they are ignored. He knows the position. Some time ago, he ordered a fairly ordinary machine tool, which he did not wish to make himself, from a leading machine tool manufacturer. A delivery date was given—many months ahead—and duly arrived. Weeks passed, and the efforts of progress chasers and the

works manager failed to produce delivery.

Finally George Carter rang up the managing director of the firm himself, and asked mildly when he might expect to see his order. "Who the—— d'you think you're talking to?" was the response. The subsequent conversation was somewhat heated. It ended with the managing director saying, rather plaintively, "Look, Mr. Carter, we've got three thousand customers in the same position as yourself. Why can't you just write in like they do?"

George Carter ultimately got his delivery, but, as he says, "We're going to relieve that firm of some of those 3,000 customers!"

Most of the responsibility for the long delays in obtaining machine tools is due, according to George Carter, to the fact that even standard tools are too often made "one off" to the customer's own design. But in fact design in standard tools such as a radial drill changes very little and then only slowly, and he sees no reason why such tools should not be made in batches of 50 to 100 by mass production methods, with all the economies of time and cost that this will entail.

Ajax Looks Ahead

Plans for this relief work are well ahead. A new factory has been bought in Halifax, and is now being equipped. This will take over current production of machine tools, leaving the old works to concentrate on washing machines. Output of the present lines will be expanded, and new models, of heavier calibre, introduced. In particular, designs have already been worked out for a 5ft. radial drill.

At 41, with a comfortable fortune, a wife and five children, George Carter might justifiably expect to slack off a little. Not so George Carter. With plenty of ideas, and the finance and organizing ability to back them, he is going ahead, and the machine tool industry will have to look to its laurels if it is to meet the competition of this energetic young man.

Look Out for WHAT'S NEW



FOUNTAIN BRUSH

LIKE a conventional fountain pen in appearance, the *Fountainbrush* marks clearly and heavily with a waterproof, instant-drying ink. This multi-purpose instrument uses interchangeable felt tips or nibs and will write on any surface including metal, glass, Cellophane, plastic, fabric, etc. The ink leaves a permanent smudge-proof and fade-resistant mark, making the pen useful in the office, the stores, and shipping and industry generally.



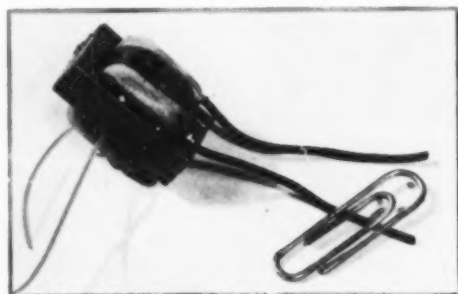
SEEING HELPS SELLING

A VISIT from the travelling salesman could become an almost entertaining event if he was armed with a *Sterolist*. With this optical instrument the client could view coloured, three dimensional stereoscopic photographs of the product in question. Presenting the depth and natural colours of the photographed subject this Bakelite instrument is neat and compact, featuring special adjustments as aids to complete visual clarity.



LIGHT WRITER

WRITING the orange-coloured sign in the accompanying photograph was done as simply as constructing words with children's blocks. Individual, interchangeable letters made of gas-filled glass tubing are placed in any position on the back plate where they adhere magnetically. When the electric-conductive glass panel is closed, the letters flash on in brilliant neon-like colour. Completely new, *Neogrom* plugs into any mains supply or can be battery operated.



TINY TRANSFORMER

SO small it could be slipped through a wedding ring, this new miniature output transformer weighs only $\frac{1}{8}$ of an ounce and measures just .438 in. by .55 in. square. This tiny unit was designed principally for use in hearing aids and is highly resistant to damp conditions. Windings—almost as fine as hairs—are wound on a single hobbin specially moulded from luxoid opal moulding powder. The whole: a feat of miniature engineering.

This Mechanized Office Gives Day-to-Day Management Control

By JULIAN ACOMB



By streamlining office routines and making the fullest use of modern office machines, the accounts department at Patons and Baldwins Ltd. handles many thousands of small accounts efficiently and expeditiously. In addition, it provides management quickly with just those control figures necessary for the determination of production and sales policy in a rapidly changing market.

ACCOUNTING and office procedures at the new Patons & Baldwins' factory cover not merely the activities of the Darlington factory itself, but also those of other Patons & Baldwins factories and warehouses and (to some extent) of the affiliated companies and branches overseas.

Even when the transfer to Darlington is complete, there will be production units remaining at Holmfirth, Matlock and Alloa specializing in types of yarn not manufactured at Darlington. In addition there are a series of warehouses, two of which are housed in the same buildings as the factories at Alloa and Darlington. There are thus regular deliveries of goods from the factory at Darlington to the warehouse at Alloa, and from Alloa factory to the Darlington warehouse. In addition of course, all factories deliver to all other warehouses.

Patons & Baldwins' customers, numbering some thousands, consist of the larger and medium-sized retailers (drapers, wool shops, etc.), wholesalers, who re-sell to the smaller retailers, and knitwear manufacturers who make up P & B

yarns into garments for re-sale.

Customers send their orders to the nearest warehouse, which meets them from stock, and invoices the customer direct. All subsequent accounting, however, is, in general, centralized at Darlington, though, for reasons of policy, Alloa retains a certain degree of autonomy.

The activities of the Darlington office thus cover:

- (a) The purchase and expense accounts of all English factories and warehouses;
- (b) Invoicing for the Darlington warehouse;
- (c) Sales accounting for the

Darlington and other warehouses; and

(d) Management accounting for the whole Patons & Baldwins group.

The system of dealing with customers' orders at Darlington has been neatly dovetailed with the warehouse organization.

Immediately an order is received, it is inspected to see whether the quantities required are within the customer's allocation under the present rationing system. The order then goes to an order clerk for vetting. Orders from small retailers are often couched in such



General view of the main accounts office on the first floor

terms as "the same as I had last month." Thus the order clerk has a good deal to do, correcting errors and omissions, clearing up ambiguities and deciphering handwriting. At the same time, he marks the items on the order with the number of the section in which they are stored.

The amended order is passed to a typist, who copies the details (except for the name and address of the customer) on to a house order form, with three carbon copies, setting the items out in the numerical order of the storage sections. The house order is a preprinted form of continuous stationery, and the details are filled in on a flat-bed typewriter.

House orders are detached as completed, and passed, with the original order, to a checker, who compares the two and sees that any special instructions regarding packing and despatch have been added. She also notes which sections the order must go to, and strikes off the corresponding numbers in the "boxes" printed at the head of the form.

Credit Control

DOCUMENTS are then passed together to the addressing section, where the name and address of the customer is printed on each copy by an addressing machine. One or more gummed labels are printed at the same time. A metal plate is kept filed alphabetically for each customer.

These plates also play their part in credit control. If the credit status of any customer becomes unsatisfactory, the sales ledger department informs the addressing machine operator, who attaches a red tab to the address plate of that customer. If an order is subsequently received from this customer, the operator notes, when she comes to complete the order, that the address plate is marked and refers the order to the sales ledger department, who hold it until such time as the credit situation is rectified. There is thus a complete and automatic check on



The punched card department, with part of the calculator section on the extreme right.

potential bad debts that does not involve any extra work.

From the addressing machine, all documents go to a control panel at the end of the office from which pneumatic tubes run to each section of the warehouse. One copy and the original order are detached and filed temporarily. The three remaining orders and the gummed labels are sent by pneumatic tube to the first of the sections from which items are required.

At the section the documents are clipped on the front of a trolley by a bull-dog clip, and the trolley loaded with the items called for from that section. When loading is completed, the girl in charge ticks off the item and initials the appropriate box.

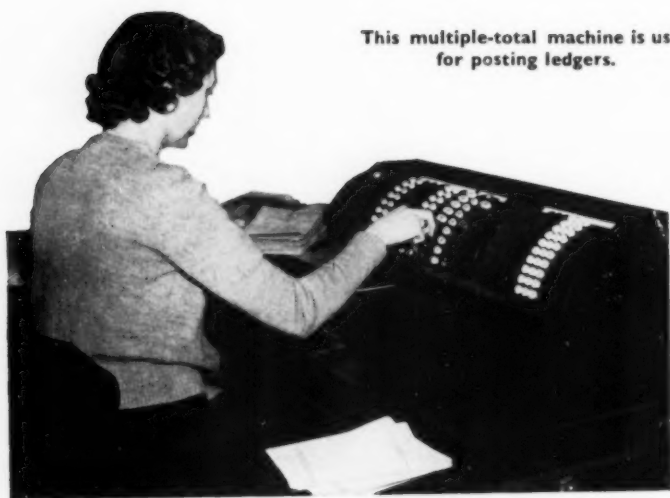
She then moves the hand on a dial on the trolley to point to the number of the section next on the list, and attaches the trolley to the conveyor which takes it round the warehouse until it reaches the section indicated. Girls are continually on the lookout for the arrival of trolleys whose dials mark the number of their sections; the trolleys are moving slowly and the dials are visible at 30 yards' range, so that there is little danger of a trolley being allowed to overshoot its proper station. Even if it did, it would merely make a complete

circuit of the warehouse before returning, and the probability that one particular trolley would be missed twice running is remote.

As the trolley arrives, the girl in charge of the section detaches it, inspects the order form, fills the trolley with the requisite items, initials the form, and sends the trolley on its way to the next section on the list. The girl in charge of the last section, when she has completed her part, turns the dial to the word "Checker," and the trolley travels to the final checking point.

Here the checker compares the total contents of the trolley with the bottom (clean) copy of the order form, and, if no discrepancy is noted, passes the trolley and its contents to the packing section, together with the third unmarked copy of the order form, which acts as a despatch note to the customer, and the gummed labels. The copy initialled by the various section superintendents is retained in the warehouse. The third copy, with the checker's signature, is returned to the order and invoice department, where it is married with the follow up copy filed there and the customer's order.

The latter are then filed in the customer's folder, while the former is passed to the pricing section for



This multiple-total machine is used for posting ledgers.

price, extensions and totals to be entered. It thereupon becomes the document from which the invoice is copied. The invoice is made out in triplicate, one copy going to the customer, one to the ledger department, and one to the statistical department. It is again typed on a flat-bed machine, using continuous stationery. Invoicing is de-centralized, each warehouse being responsible for billing the goods which it has sent out.

The statistical department is centralized at Darlington, while the ledger department is centralized at either Darlington or Alloa. The ledger copies of the invoices are passed in batches to the ledger department which maintains the customer's account, the posting being done on a normal book-keeping machine. Reconciliation is effected batch by batch with the statistical copies so that constant balance is maintained. Cash received from customers is recorded on strip receipts and duplicated into sales cash books, the totals of which are taken into the main cash book at periodic intervals.

The statistical copies are passed to the statistical section and form the basis of the sales postings to

the various nominal ledger accounts.

Purchases and expenses are analysed mechanically in appropriate groups, the totals of which are posted periodically to control accounts in the nominal ledger. In general, therefore, the work on the financial accounts is kept strictly to a minimum, the detailed analysis being passed to the cost control department for individual recording.

Sales records, which are used as the basis of managerial decisions and actions, are prepared in the statistical department from the third copy of the invoices. Every

invoice is transferred to a punched card, with all the details punched in. These cards are regularly sorted and tabulated to give daily, weekly, monthly and half-yearly reports covering every facet of the business.

The amount of detail given in the reports varies according to the speed at which they are required and the purpose which they serve. The daily report, for instance, is merely a total of the invoices sent out. The weekly report shows total sales for the week, tabulated according to products. The monthly figures analyse sales according to separate products and separate areas. The half-yearly figures are even more complex, and tabulate the sales of every product made by every individual salesman.

In addition, the daily sales of the Darlington warehouse are tabulated by quality and shade and this tabulation is used to complete the stock records of this warehouse.

The data thus obtained play a considerable part in shaping management decisions as to future operations. In particular, they determine stock control policy. It is not possible, as in other industries, to lay down any hard and fast rules as to the minimum and maximum amount of any one item which must be held in stock, since demand—even in a sellers' market—is in a continual state of flux.

Orders on the factory from the



Another section of the attractive offices at the Darlington factory.

8 Points for Management

1. Centralize office procedures as far as practicable.
2. Integrate office with warehouse and factory routine.
3. Concentrate on cost, not financial, accounts.
4. Analyse invoices mechanically to secure information on sales trends, travellers' performances, etc.
5. Analyse costs to eliminate unprofitable lines and spotlight costly processes.
6. Control stock levels by means of analyses of sales.
7. Standardize office furniture and equipment; use flexible, rather than special-purpose, machines.
8. Plan office lay-out to minimize movement.

warehouse are given by a liaison officer in constant contact with both parties. In giving orders he notes not merely the current state of stocks, but also any trends in consumption and demand that are thrown up by the statistical analysis of recent sales. He can thus often anticipate a change in fashion and modify his production plans accordingly.

In addition to the regular periodical reports, the punched cards are used to prepare special reports on subjects of topical interest. One report recently made was a breakdown of sales into size groups—the proportion of sales in the £5 to £10 size, £10 to £15 size, etc.

At the moment, the application of punched card accounting to stock control on the card-per-unit basis is under consideration. The preparation of invoices and statements by the same means is also being explored.

At the same time as sales are being meticulously analysed by the statistical department, expenditure is being equally carefully studied by the costing department. Stan-

dard costs based on previous experience, modified by later developments, or on studies of potential efficiencies, are being worked out for every product and process. The fact that the Darlington factory is even yet barely completed and equipped has presented considerable difficulties in the installation of the system, and certain overheads remain estimates not tested by practice. These, however, are but minor and temporary limitations on a system that has been proved in operation at other P & B

factories, and that is giving management reliable guidance on policy at Darlington.

With, on the one hand, an estimate of demand, based on sales forecasting modified in the light of production capacity, and, on the other, a schedule of standard manufacturing costs for that output, a budget is prepared for each department and for the business as a whole. As the actual figures of revenue and expenditure come in, they are checked against the budget, and the variances of the various items noted. By concentrating on these variances, management is thus enabled to conserve its forces to tackle the laggards, while allowing departments running to schedule to operate without intervention.

The control accounts produced for the guidance of factory management are subsequently incorporated in short term profit and loss accounts which set standard cost of sales against sales income. By the application of variances of actual expense from standard, both in the factory accounts, and in the overhead controls, these reconcile exactly with the annual "Financial" accounts. In this connection the detailed sales analysis is of great importance.

The system automatically provides the basis for a sound price policy, since actual costs are be-

A house order form, which, as can be seen, is one of a four-part set.

ing continually checked against standards and up to date information is available when decisions are to be taken. In the field of pricing the unprecedented rise in the raw materials market during the last 16 months has presented problems of the utmost difficulty, not only to this company but to the whole of the wool textile trade, in the judging of markets and in the re-financing of the stocks.

Impressive Offices

THE offices are, as might be expected, architecturally impressive. The administration block in which they are housed is the only two-storey block on the site, and dominates the whole area. The entrance hall, running the full height of the building, has marble walls and floors, with an island reception desk in the centre flanked by a double staircase. Floor-to-ceiling windows form the whole of the front wall.

On the second floor, a long cream-walled corridor runs the entire length of the building, with the main large offices opening off to the front of the building and a series of smaller offices and interview rooms at the rear. The flooring is of cork blocks, and heating is by convection radiators and by concealed panels in the ceiling.

Office furniture is standardized throughout, and is all-metal. Desks are provided on the unit principle, so that they can be varied to meet the demands of the user, both as to size and shape. All furniture—desks, filing cabinets and cupboards—is painted light (not olive) green, while the desk tops are of black linoleum.

When the construction of the offices was being planned, a considerable amount of discussion took place as to whether they should consist of a few large rooms or a series of smaller ones. It was finally decided that large rooms should be adopted, since this would enable the inevitable re-arrangement of desks and machines that occurs in the process of settling down to be carried out more easily, and because it was felt that the

flow of work from section to section would be facilitated.

Patons & Baldwins were one of the earliest users of office machinery, and the strong bias towards mechanization remains. They make use of an extensive range of equipment, of many different types and makes. Wherever a machine can be of assistance to a clerk, there is one on his desk or at his elbow. The overall result is a high degree of mechanization, so that a vast amount of administrative work is carried out with a relatively small number of staff and without taking an undue amount of space.

Considerable attention has been paid to office layout, so that a flow of paper work has been obtained that moves steadily in one direction without back tracking and time-wasting journeys.

For all their bias towards mechanization, however, Patons & Baldwins do not accept machines blindly. There is a strong inclination, for instance, to concentrate on those types of machines that are most flexible in operation, rather than on single-purpose machines which may do a particular job more efficiently, but are useless for others.

Geographical considerations partly account for this. Darlington is not a large industrial centre, and the machines are serviced from Middlesbrough. Thus in the event of a machine breakdown it will take a mechanic some hours' travelling on top of the actual repair time, during which the machine will be idle. If its work could not be switched to another machine, the result might well be serious.

NEW for your OFFICE

Peerless Calculator

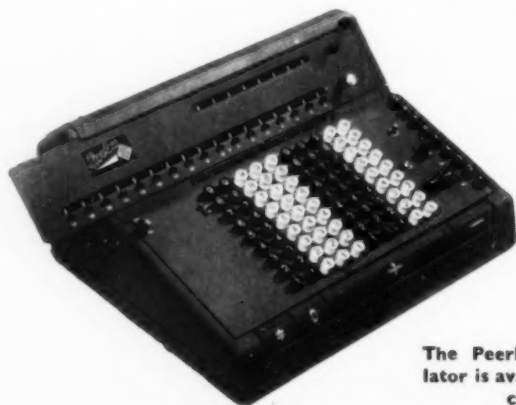
ALTHOUGH only recently introduced to the English market, the German *Peerless* calculator has been an established make on the Continent for the past 30 years. The *Embee* model is a full keyboard machine in varying capacities, from 8 by 6 by 10, to 10 by

8 by 17; it has tens transmission throughout all models.

Streamlined and modern in appearance, the machine is designed with the motor bars flush with the cover plate. The plus bar is in the centre with the minus on the right and clearance bars on the left. The latter operate individually or together, one clearing the top two registers and the other the keyboard. The plus bar can be used for both plain addition and multiplication.

The machine has two keyboards

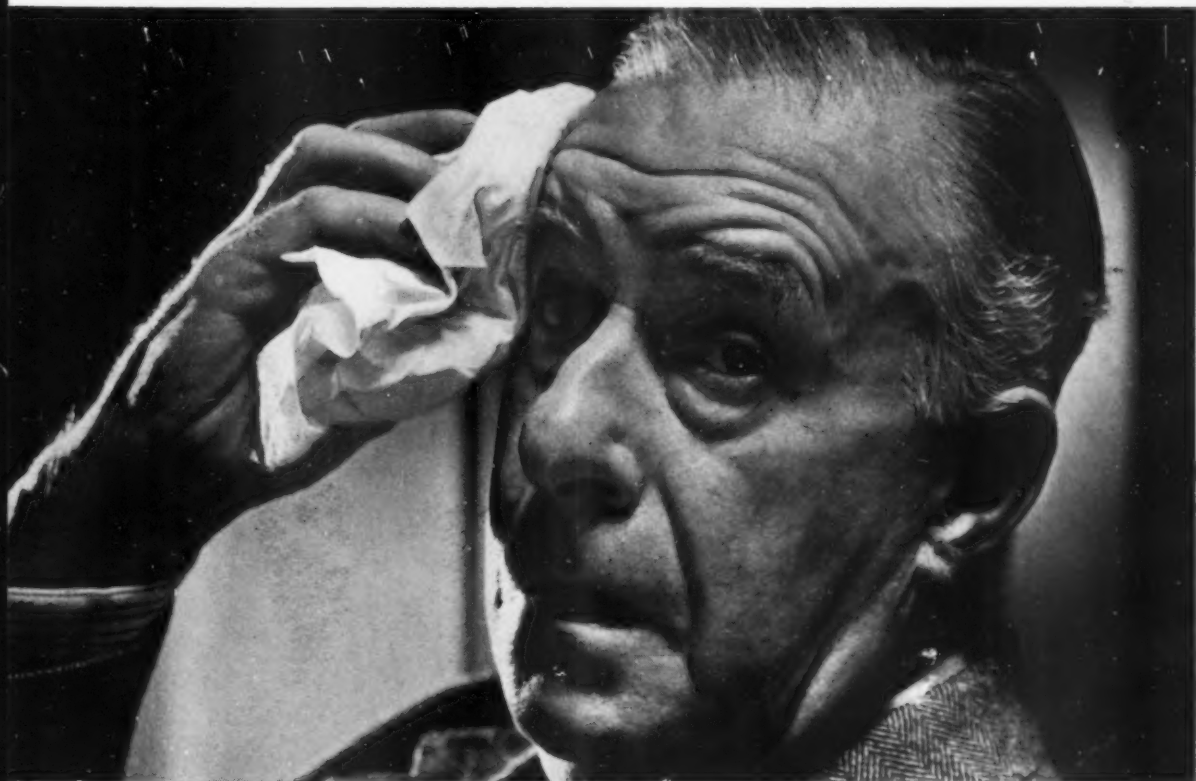
*Continued on
page 100.*



The *Peerless Embee* calculator is available in varying capacities.

BUSINESS

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Mr. F. H. BUNN,

Director and General Sales Manager, Hoover Ltd.

STAFF co-operation involves three principles essential for its success.

- (1) That all must feel that they are part of a team.
- (2) That every member of the team from the managing director to the office boy must know the aims, feel that the aims are worthy and in their own interest, and know how they are to be achieved.
- (3) That workpeople must feel that their job is of the utmost importance and that senior men must not contrarily convey the impression that theirs is the only job of real importance. All are of equal importance to the team.

Sales managers have been used to fostering the competitive spirit among sales staff, sometimes forgetting that a similar spirit engendered among production and administrative staff would achieve better results—and a better product reaching the customer. The inculcation of such a spirit in a large organization needed both long and short term policies.

Mr. H. C. BELL,

Chairman, Bell & Nicholson Ltd.

CHAOS still reigns at the Board of Trade over the utility clothing scheme. The process of revision after review and review after revision goes on indefinitely, but never catches up with the realities of production and distribution, supply and demand, as they exist for a particular class of merchandise at a particular time. All recent attempts at modification and simplification have been defeated by the steep rise in raw material prices over which there is no control. The many examples of bureaucratic ineptitude, and ignorance of the normal channels of distribution, as expressed through multifarious Statutory Instruments, are a constantly recurring source of dissatisfaction, dilemma and dismay. In all the circumstances, it is regrettable and surprising that our trade leaders, through representative trade organisations, have not been more courageously combative in concerted opposition to the continuance of the scheme.



Sir HAROLD BOWDEN, Bt., G.B.E.,

Chairman, Raleigh Industries Ltd.

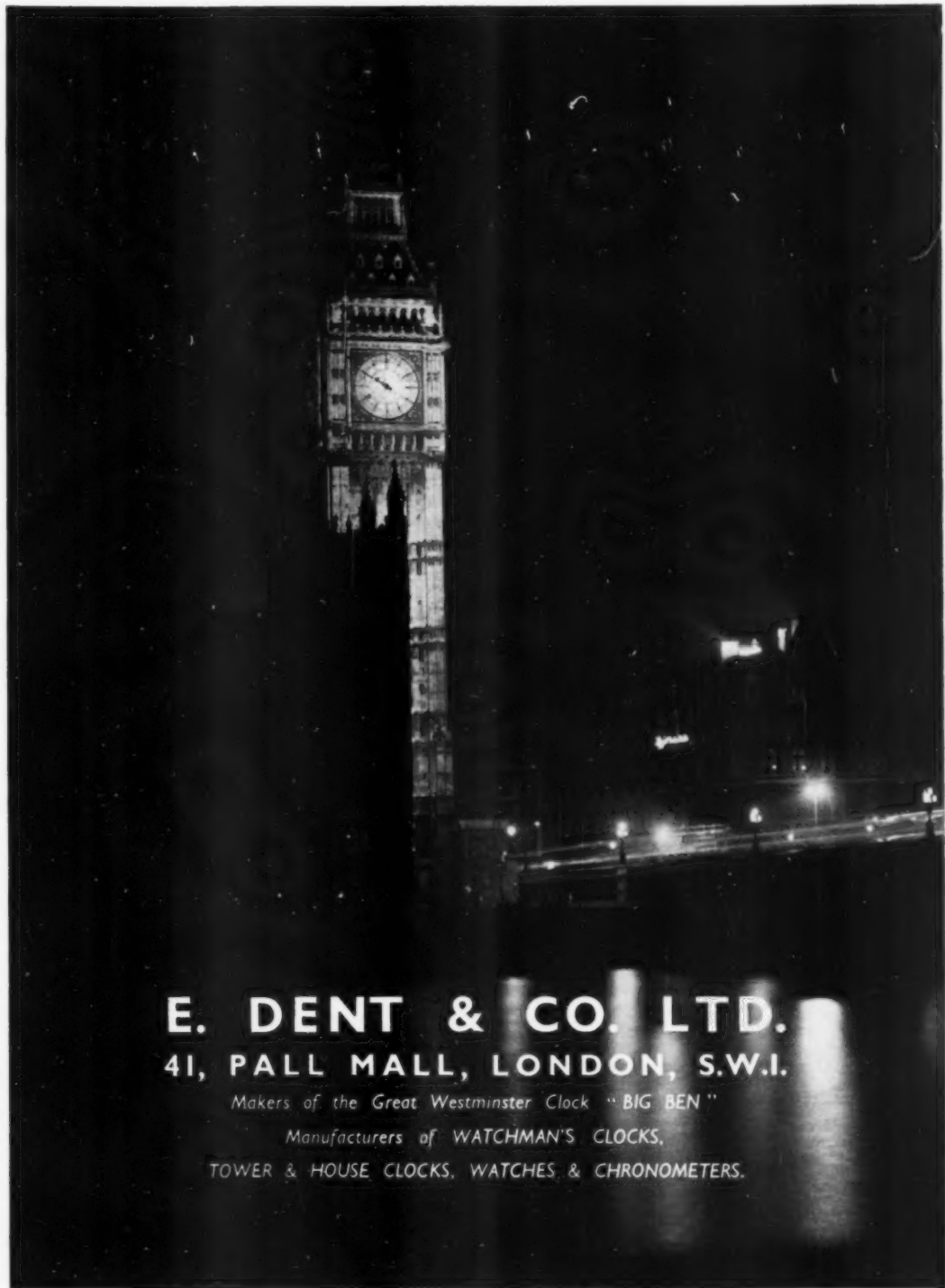
TWELVE months ago the increasing demand for our products was so great that we could not satisfy our customers' requirements. That state of affairs still holds good—in fact, is accentuated—and is especially marked in our foreign markets, which are of such value to our country at the present time. I feel, however, that unless a halt is called to rising costs, it will be impossible to maintain our existing prices, and this in turn may jeopardise our large and competitive export markets.

There is still some talk about restricting profits, but as turnover increases so should total profits increase. Without increasing profits in an expanding business it is quite impossible to finance it and accumulate the necessary reserves with which to meet the replacement and expansion of capital assets.

Wages being paid in industry to-day are approximately 100 per cent. above pre-war, while dividends have been frozen.



Continued on page 64



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BUSINESS CALLING

Mr. GEORGE W. ODEY, C.B.E., M.P.,

Chairman & Managing Director, Barrow, Hepburn & Gale Ltd.

WITH regard to the immediate trading prospects of 1951, it is again quite impossible to make any reliable forecast. The recent steep advance in the cost of our raw material has created a very grave problem, not only in the boot and shoe industry, but in the shoe repairing trade where there have been no stocks to break the impact of the increased prices. The industry shares with the government its concern at the effect these high prices will have on the cost of living. In the United States and some of the countries of Europe that are able to obtain their raw material from their own domestic supplies, it has been possible to deal with the situation by freezing prices.

It is very difficult to see how this can be accomplished in this country, dependent as we are on imported supplies for over 75 per cent. of our hide requirements. The price of the hide is by far the most important factor in the price of leather. In the case of high grade repairing sole leather, the hide itself and the tanning materials represent as much as 90 per cent. of the cost of the finished product and, unless the tanning industry maintains the principle of selling on replacement, it would rapidly find itself bereft of capital.



Mr. EDWARD BARFORD, M.C.,

Chairman & Joint Managing Director, Aveling-Barford Ltd.

THE very high cost of plant replacement, the inadequate depreciation allowances and the recent sharp increases in prices of materials and components aggravate further the cost of financing a business in which very heavy stocks of components and work in progress have to be carried.

In regard to the current year, the intensive work and effort devoted to export trade has borne good results and the outlook is satisfactory, but increasing evidence of acute material shortages and other factors beyond the control of the company preclude any forecast of trading results in the present year.

Col. LORD BARNBY, C.M.G., C.B.E., M.V.O.,

Chairman, Bolton Eagle Spinning Co. Ltd.

AS you are aware raw wool prices in common with most other commodities of international supply and use have risen to levels hitherto unexperienced. This naturally causes concern to all. A chorus of predictions in annual statements has been made by chairmen during past years to the effect that a price collapse would be imminent, and recommending liberal provisions for it. Perhaps we are now to see the real effect of lower buying price for sterling following devaluation together with the progressive rise in the U.S.A. of the value of all goods and property in terms of money. Of course, in time there must be considerable recession from momentary levels, else consumption by the civilian public would be unhappily curtailed.

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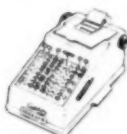


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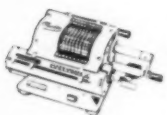
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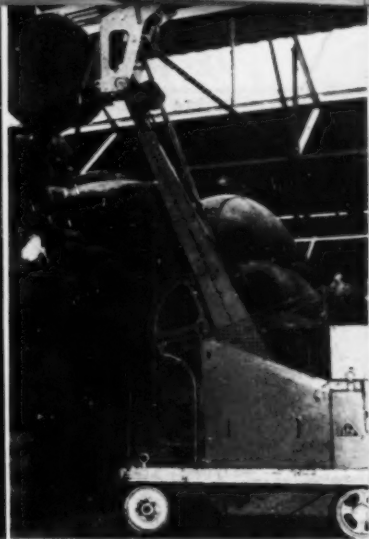
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Miracles can be achieved by mechanical handling. This is emphasized again and again in the conclusions drawn by experts. One need not, however, go to America to prove this. Here is the story of a British factory. It is the story of how many complex handling problems have been brilliantly solved by the use of varied mechanical aids, ingeniously devised and efficiently used by wise management.



Electric cranes unload bales of raw wool from rail wagons on to sleigh type trucks.



Close-up of an electric stacker, showing the jaws which grip the bales of wool.

How Ingenuity Solved 34-Acre Factory's Handling Problem

By JOHN BROADBENT

MUCH of the success of Patons & Baldwins new factory at Darlington is the result of a happy marriage between management and mechanical handling. From the earliest planning days the directors were looking for ways of employing new mechanical handling techniques. They realised mechanical handling was essential for efficient production in a 34-acre single storey plant with 1½ million square feet of floor space.

The principal mechanical handling feature is the conveyor system—an entirely new design which undoubtedly has possibilities in other industries. The many different manufacturing processes demanded a system which was flexible yet common to all departments. The transporting medium had to be detachable from any fixed route for manhandling round machines—a problem not easy to solve.

The answer was found in the use

of detachable trucks which can be engaged and disengaged from an underfloor moving rod chain. The system is easy to maintain and requires little power to drive.

All that can be seen of the conveyor is a one-inch wide slot in the floor. Beneath this is the moving rod chain to which there are pusher blocks at intervals of five feet. The moving rod travels at a rate of 30ft. per minute. On the shorter circuits power is supplied by one 7½-h.p. electric motor; on the longer circuits, two such motors are used. Each truck has an adjustable bolt at one end which, when released into the slot in the floor, is picked up by the pusher block, which hauls it along. Release from the conveyor chain is equally simple; there is a plate, like a buffer, which, when given a light kick, frees the bolt and allows the truck to be wheeled away. Should a moving truck hit an obstruction,

the bolt is released by pressure on the plate and no strain is put on the moving rod chain. The electric motors have a fluid flywheel drive—another safety measure if truck release mechanisms fail to operate.

Thirteen Circuits

THERE are 13 conveyor circuits, the shortest being 380ft. and the longest more than 2,000ft. in length. All have proved extremely satisfactory in service. The most interesting is "Track 13" which links two sections of the factory by inclines and covered bridges over a road and railway track. In spite of the steepness of the gradients, this circuit—one of the longest—has only two 7½-h.p. driving motors.

Slight alterations have been made to the adjustable bolts and pusher blocks on this "line" to avert any danger of trucks over-running the conveyor.



Electric stacker dumps a bale on to a truck attached to the conveyor system.

Maintenance is relatively light. The equipment consists of a mobile greasing unit similar to the type used by garages. With this lubrication unit one man attends to the tracks every Saturday morning, taking eight weeks to cover the 13 circuits.

At certain places the metal guard plates on either side of the slot are strengthened to take the weight of loaded crane, platform and fork lift trucks. These plates are painted silver so they are easily distinguishable as safe crossing points for drivers.

For use on the various conveyor circuits in different parts of the factory there are several types of rubber-tyred trucks. In the wool store—Track 11—a sleigh type of truck is used which is longer than most other models. Another type has a box body with slatted sides, while for carrying bobbins and reels there is a design with open sides. For carrying "tops" of wool a box type with solid sides is used.

Choice of trucks for work in the dyehouse presented more of a problem. Here the atmosphere is wet and steamy. Also, the freshly dyed wool stains timber, which would transfer the colour to the next lot of wool. The answer was a stainless steel truck which is not affected by the dyes or the atmosphere;

these models are standard for this department. Finally, there is a special type for the despatch department, which has a wooden body specifically designed for the purpose. Altogether there are well over 2,000 trucks, in use.

Many Mechanical Aids

ALTHOUGH the conveyor system may be regarded as the main mechanical handling feature at the Darlington factory, other modern handling equipment is put to good use. There are a number of belt conveyors in the sorting department—the sorters putting the selected wool on the belt, which conveys it to a suction system which in turn deposits it in any of eight blending bins. The same handling medium is used for transferring wool from these bins to the scouring equipment, and thence to the hoppers which feed the carding machines.

Another conveyor belt is to be found in the packing department. Parcels are packed on a specially designed counter, and on completion placed on the conveyor, which carries them to the despatch section.

The boiler house provides yet a further example of modern materials handling techniques. A loaded railway wagon is pushed on to a

tippier and deposits its load into the coal dump. If this dump becomes too full, a drag scraper drags the coal over a larger area. Conversely, when coal from outlying corners of the dump is required, the scraper drags the coal back to an inclined belt conveyor. This conveyor carries the coal to the top of the boiler house, where it is picked up by another belt conveyor running at right angles. Fuel on this belt can be shot into any one of four bunkers by remote control.

In the furnaces a slow moving chain grate collects the ashes, clinker, etc., and deposits them via chutes into water troughs. At the bottom of these troughs the cooled ash comes to rest on another belt conveyor, which carries it out of the basement of the boiler house into an ash bucket. The latter, when full, is lifted and unloads its contents into an elevated hopper with a capacity of 50 tons. From this structure railway wagons are then loaded by gravity.

The handling of all railway wagons on the plant sidings is carried out by a fireless locomotive. This receives the charge of steam direct from the boiler house. A full charging takes 15 minutes. On a slack day two such charges are necessary; on a busy one twice this number is required.

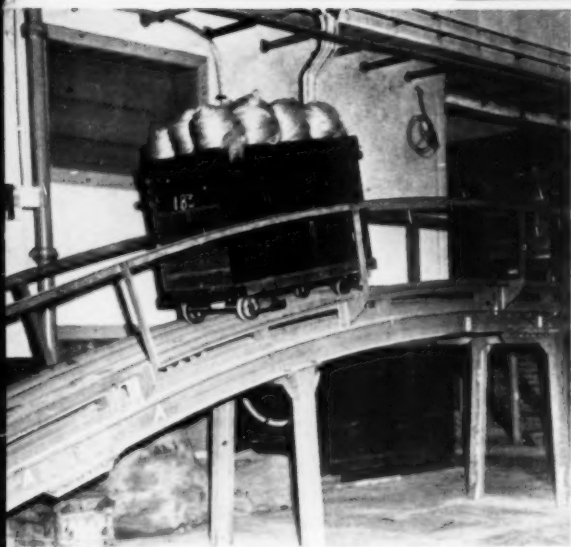
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The Problem

To find a conveyor system common to all departments of a 34-acre factory, yet flexible enough to cope with varied manufacturing processes, and with a transporting medium detachable from any fixed route for manhandling round machines.

The Solution

An underfloor moving rod chain, with pusher blocks at 5ft. intervals, divided into 13 circuits and used by well over 2,000 easily detachable, rubber-tyred trucks. Trucks are of various types according to need—sleigh type; box body with slotted sides; with open or solid sides; some are of stainless steel, not affected by dyes or atmosphere.



One of the 13 circuits of the conveyor system takes trucks over both road and railway. Left, a solid-sided truck full of wool tops seen mounting the incline. Right, what the truck "sees" as it begins to descend to the "top" stores. A safety device prevents the truck rolling back.

Continued from previous page

IN the wool warehouse there is a battery electric bale stacker and two 6-cwt. cranes. Three mobile cranes are used for lifting and transferring machinery in the factory. A fork lift truck serves for similar maintenance work, such as the removal of rollers from carding

Below, in the warehouse. Dials on the trucks indicate the number of the section from which goods are to be drawn for completing orders.

machines. Eight electric platform trucks are available for general transport purposes and for handling goods not in process.

Overhead cranes are used in the loading and unloading bays. These are all electric models of 10 cwt. capacity. In the despatch bay there is also a 5-ton model for handling containers on and off railway flat trucks. In the dyehouse electric pulley blocks lower and lift wool in and out of the dye vats. Even the chains on these appliances are of stainless steel to avoid corrosion.

Permanent drivers work the cranes, but any authorised person can drive the electric trucks. All these electric vehicles are put on charge every night at one of the six chargers situated in various parts of the factory. Maintenance is simple—one reason why battery electric cranes and trucks have proved so popular and satisfactory. One electric truck is called in each week for overhaul; cranes get a six monthly check. Minor repairs are carried out by "local" mechanics in the respective sections of the factory. Overhauls and heavy repairs are dealt with in a central maintenance department which is responsible for all internal and external transport.

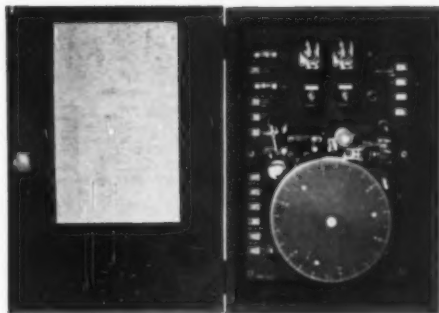
There are few handling jobs which are not mechanically assisted, and these are receiving the constant attention of Patons & Baldwins engineers. With such a forward outlook, aided by an enlightened directorate, no doubt these remaining problems will shortly be solved.



Left, close-up of the conveyor coupling attachment, showing the release plate and engaging bolt.

The Whole Day's Routine

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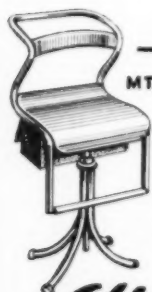
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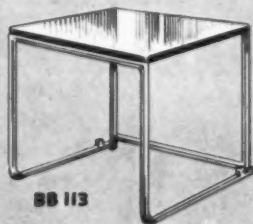
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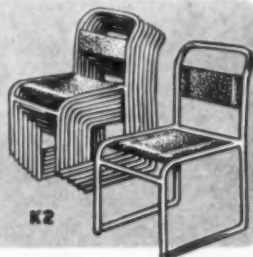
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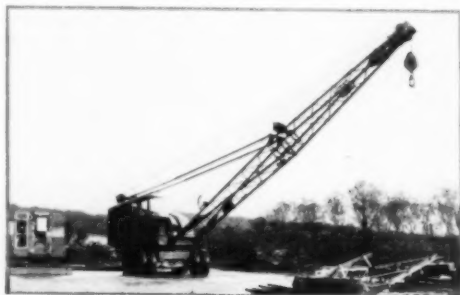
Special features include: power-operated steering; specially designed hydraulically-operated clutches; differential free-wheel drive; safety hoist unit; single or double hoist drums; power-operated lowering; and automatic lubrication.

Powered by a 55/60 h.p. radiator-cooled, self-starting oil engine, the *type R* is available with the following jib sizes: for 10-ton loads, a 30ft. fabricated box section jib

with short swan-neck head; for lighter loads and greater reach, there are standard 45ft., 60ft., and 75ft. tubular steel lattice jibs. These units have maximum load lifting capacities of 6 tons, 4 tons and 2½ tons respectively. Lifting capacity of the 30ft. swan neck jib is 10 tons.

The crane is mounted on eight heavy-duty pneumatic tyres and will travel at speeds of from one mile per hour in bottom gear to 5¼ m.p.h. in top gear. Hoisting

The *type R* 10-ton mobile crane.



speeds are: 10 tons (4 part rope): 30ft. per minute; 6 tons (2 part rope): 60ft. per minute, and 3 tons (1 part rope) at 120ft. per minute.

Main dimensions include: overall width (over tyres), 11ft.; overall height (excluding jib) with low "A" frame, 12ft. 10in.

—(Enquiry Ref. No. A.51/40.)

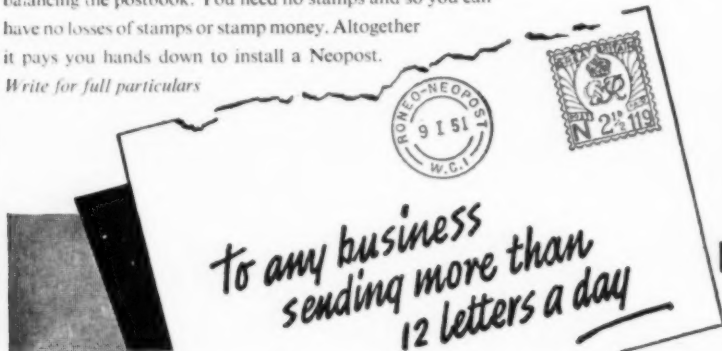
All-British Grader

POWERED by a 100 b.h.p. Leyland, six-cylinder diesel engine and featuring all-wheel drive and all-wheel steering, the new 99-II grader has easily-operated full hydraulic control. All ad-

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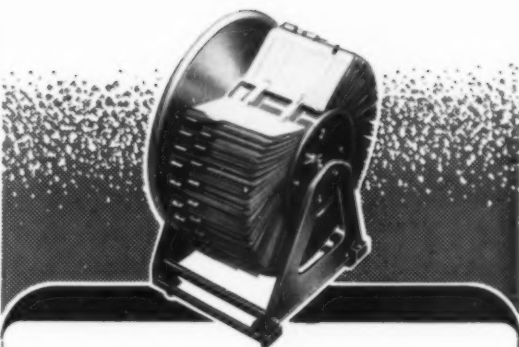
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APRIL, 1951



RECORD CONTROL

CARDWHEEL is the speediest, easiest — and most efficient of all Reference and Recording Systems!

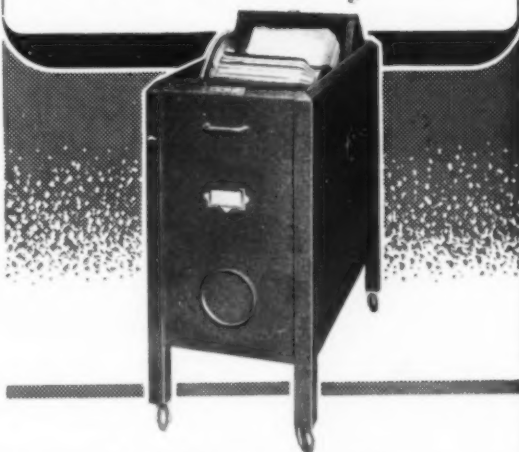
CARDWHEELS are compact, complete and flexible — cards can be quickly inserted or removed without disturbing the proper sequence of the remaining cards.

CARDWHEELS can be used for ANY card index application where speed of reference and posting is required. Entries can be posted DIRECT on to both sides of the card WITHOUT REMOVAL.

CARDWHEEL Models are available for card sizes 4" x 2", 5" x 2", 5" x 3", 6" x 4" and 8" x 5". Your existing cards can be transferred to CARDWHEEL without any expensive change-over.

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C. W. CAVE & Co. Ltd.

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71

justments, from positioning the blade to steering by all four wheels, are by finger-tip pressure valve handles in the cab.

Blade of the grader is 13ft. long and has a side-shift range of 4ft. 2in. and an extreme blade reach of 10ft. 1½in. beyond the rear tyre. The operator does not have to leave the totally enclosed cab to move the blade to positions including the complete reverse, the vertical, or the various banking angles.

A range of attachments is available for use with the grader. These include the scarifier (11 tine), bulldozer, earth loader, snow plough and snow wing. Of the two brakes fitted, one is a foot-operated hydraulic expanding

brake and the other a hand-applied mechanism. Grader dimensions are as follows: wheel base, 18ft. 8in.; length, 24ft. 3in.; height with cab, 10ft. 1in.; width, 7ft. 10½in.; turning radius, 30ft.

—(Enquiry Ref. No. J.51/10.)

PORTABLE POWER TOOLS

Two-speed Drills

"TWO speeds for the price of one" might well be the motto of the G2 or H2 portable electric ½in. and ¾in. capacity drills. For the makers claim that they are able to market the two-speed drills at a price which compares favourably with the orthodox single speed tool of similar capacity.

The advantages of two-speed action are fully appreciated when a job entails drilling a ½in. or ¾in. hole through steel with a portable



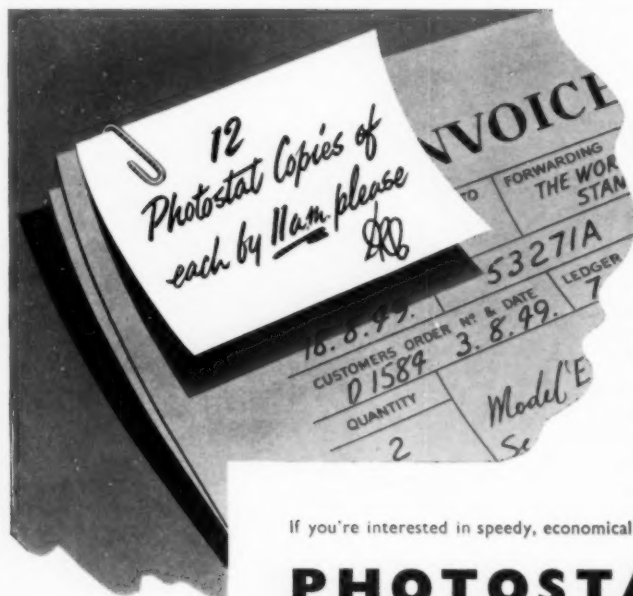
One of the new two-speed portable electric drills.

machine. By using the high speed ratio together with a small-gauge drill, the operative can put through a pilot hole, which makes entry of the larger drill, running at slower speed, comparatively easy. A conveniently placed change speed control button simplifies the gear change operation.

The drill, which is capable of heavy duty work with steel, concrete, masonry or wood, has an output of .35 h.p. at a consumption of 490 watts. The universal motor,



The all-British 99-H Grader.



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Take it away for the week-end, and connect it to your radio with a length of flex. It will record any broadcast programme. Used with your home cine, it will add commentary and music to your silent films. Play gramophone records on its turntable and it will record the music as it plays.

And, of course, when you take it back on Monday, on the 10.15, the same 60 minute reel of wire, automatically erased, is ready for a business conference, a day's correspondence, or a two-way record of phone conversations. Words cost nothing with a Wirek. May we send you details of Model B I.?

WIREK (ELECTRONICS) LTD.

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APRIL, 1951

which is radio interference protected, features a hand former wound armature, unusually long pigtail brushes, and an efficient cooling system. Awkward wiring connections are eliminated by the use of spring contacts from the fields (made in two halves) to the brushes.

Two sets of helical chrome-nickel-molybdenum steel gears, together with the change-speed control mechanism are enclosed in a gear box of completely new design. It is compact and conforms with the design of the die-cast, silicon-alloy body casing—an attractive finish to this portable electric unit.

—(Enquiry Ref. No. A.51/42.)

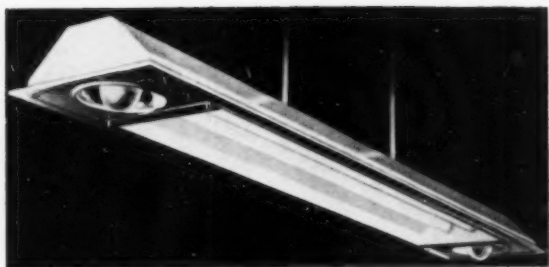
LIGHTING

Advance in Lighting

THE elimination of transformers, capacitors, starters and chokes, has cut down the weight and cost of an instant self-start fluorescent lighting fitting.

A 40 watt 4ft. fluorescent lamp operates in series with a special tungsten ballast lamp which also functions as an efficient source of

The Ardingley instant self-start fluorescent lighting fitting.



light. Both form a complete circuit consuming about 113 watts on 230 volt A.C. mains.

Makers of the new system claim an overall initial (100 hours) luminous efficiency of about 22 lumens watt, or twice that of ordinary tungsten lamps. Other advantages include a pleasing blend of fluorescent and tungsten light in a single lighting fitting, instant self-starting and restarting, reduced weight and wiring of lighting equipment, and long average life of the lamps.

The *Ardingley*, as shown, is an all metal trough fitting of conventional form, with a length of just under 5ft. 3in. and a width of 11in.


—(Enquiry Ref. No. A.51/43.)

INSTRUMENTS

Electronic Micrometer

ATTRactions of electronic measurement are demonstrated by a recently developed instrument used in connection with the new *Proximity Meter*. Among its advantages is one of considerable importance—the elimination of "pressure errors."

Working on the principle that dimensional displacement can be represented by a change in electrical capacity, the instrument makes use of a radio frequency bridge system. With this, the



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APRIL, 1951



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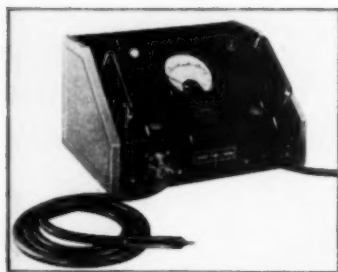


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The Proximity Meter.

micrometer is capable of measurement and comparisons to limits which are impossible by other methods. The unskilled can operate the equipment and errors caused by incorrect pressure, etc. are completely eliminated.

With one form of measuring head it is possible to discriminate to one millionth of an inch, if required. With this type, the work itself is used as one condenser plate and the measurement is achieved without the specimen being touched. With objects which do not present a flat face to the mea-

suring head, a plunger moves a condenser plate which effects the measurement.

The *Proximity Meter* is a self-contained mains driven unit housed in a light aluminium case, conveniently arranged for bench use. It is simple to operate and suitable for continuous operation under industrial conditions. One form of the micrometer head may be permanently attached to rolling mills, etc., for continuously monitoring or recording dimensions of strip, sheet, etc. Other uses include the accurate measurement of specimens and the examination of precision parts to great accuracy.

—(Enquiry Ref. No. A.51/47.)

Packaging Detective

A RECENTLY developed use of radioactive materials in industry is the *Package Monitor*. This is a detecting instrument which should be of interest to those engaged on mass production packaging.

The instrument will detect incompletely filled packages to a de-

ficiency of two per cent. of the correct filling by bulk, and can be used at examination speeds of up to 600 per minute. It will detect package filling deficiencies in a wide variety of products including



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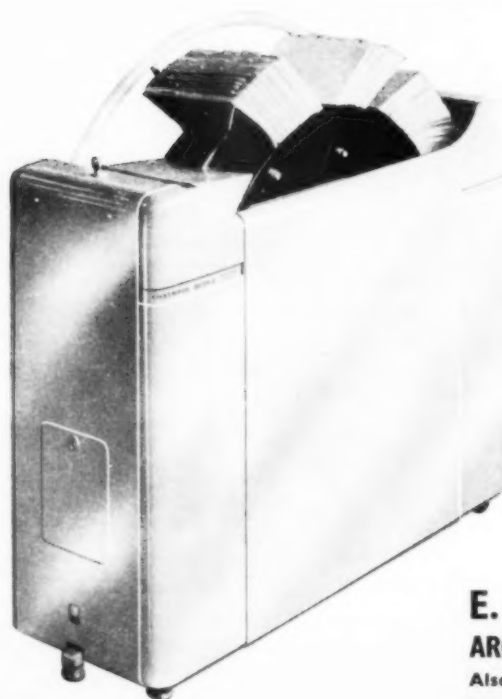
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New space saving methods permitting control of greater numbers of cards by one operator will be shown and demonstrated at the B.I.F.



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Incompletely filled bags or packages are indicated either through a warning light or physical ejection from the main stream of products. It is applicable equally to steel or metal containers and to paper or plastic bags of greatly varying dimensions provided that the radioactive material is correctly chosen for the purpose.

—(Enquiry Ref. No. A.51/46)

GAUGES AND TOOLS

Multi-purpose Tool

A NEW 2½lb., 12in. long reciprocating hand tool, which provides a means of mirror-finishing angles, bores and radii on round and shaped drawing dies is now on the market. The tool can also be used for filing, honing, etc., where positive reciprocating action is desired.

Free from vibration, the hand tool gives 700 3/16in. strokes per minute and is shown in the illustration in operation on a hexagonal

tungsten carbide die, with the electrics, which are also supplied, mounted on a common base, and fitted with a hand-grip for portability.

The unit is driven by a ½-h.p. motor through the medium of a 4ft. 6in. flexible drive.

—(Enquiry Ref. No. A.51/44.)

Lathe Chuck

A NEW automatic self-centring three-jaw lathe chuck will take a range of material from 1/32in. to ½in. (round bar). It grips and releases while the machine is running and dispenses with the need for any collets within the ranges mentioned.

Of steel construction with hardened jaws and scroll, the unit has two sets of jaws: No. 1 with capacity of 1/32in. to ½in. and No.

2 for ½in. to ¾in. The unit weighs 18lb. and has a diameter of 7½in. It is supplied with a one-inch plain hole backplate, unless ordered to suit particular spindle specifications.

—(Enquiry Ref. No. A.51/45.)

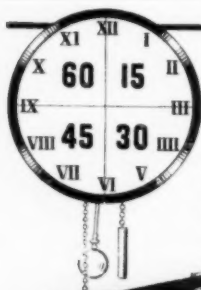
PROCESS EQUIPMENT

For Wax Pattern Making

A PNEUMATIC and hydraulically controlled injection machine for the high speed precision production of wax patterns used in the lost wax casting process is now on the market. Special features are the electrically heated oil jacketed 3½ gallon wax container with thermostatic control; 3-stage nozzle heating, and gauge panel indication arrangement



The 2½lb. multi-purpose reciprocating hand tool.



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We refer to recording time, of course—it is such a vital consideration. Some machines offer as little as three minutes—adequate in certain circumstances, perhaps. Other machines provide for six minutes—

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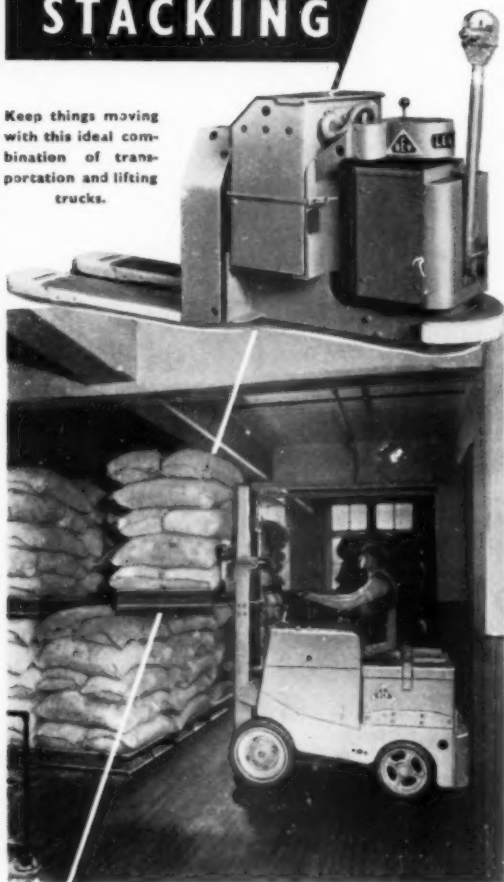
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Type H.23 designed to lift 1 ton to a height of 8' 6". The lifting mast is provided with a hydraulic tilting motion which moves forward through 3° and dips the fork to pick up loads directly from the floor and moves backwards 10° to retain load safely during transit.



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APRIL, 1951

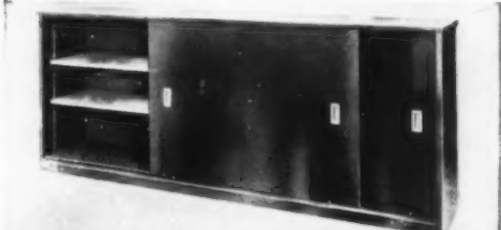
Harvey



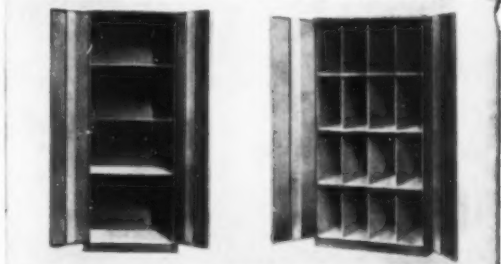
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Wax is kept from freezing in the machine, generally or locally, by the electrically heated oil circularization system, thermostatically controlled, and providing for heat ranges between 40 and 120 degrees Centigrade. Fluid wax at the injection point is assured by special nozzle heating.

The two-stage pneumatic pressure system, with visible dial indication, will give a low pressure of up to 75 lb. per sq. in. or high pressure under separate control up to 1,280 lb. per sq. in. An hydraulically operated table is controlled by foot pedals,

Injection machine for producing wax patterns.

the unit being capable of up to one ton clamping pressure.

The machine, which is supplied ready for connection to a ring main or alternatively provided with a built-in pump and tank, will fill average size dies in a few seconds. Wax must set for a few moments however, before removal from the nozzle. Warning lights indicate that the machine is connected to the power supply, or that a required temperature has been attained. Other gauges and dials allow tabulation of readings, thus making possible repetition of particularly successful injection conditions.

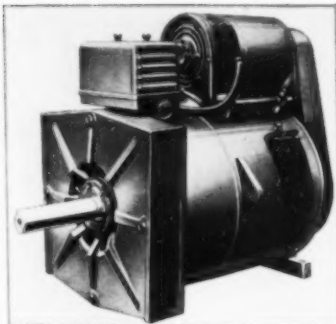
—(Enquiry Ref. No. A.51/48.)

GENERAL EQUIPMENT

Voltage Regulator

A SMALL engine-driven generator, often used as a supplement or an alternative to mains supply, can, under certain conditions, be inefficient when used without some form of voltage regulation. A comparatively inexpensive self-regulating alternator has been developed for this purpose.

Designed for operation and



Magnicon voltage regulator unit.

maintenance by unskilled attendants, the standard *Magnicon* unit controls its own voltage within plus or minus 2½ per cent. of the normal value. Special machines can be designed with an inherent regulation within plus or minus one per cent.

The exciter and rectifier for the control circuit are mounted on top of the alternator to form a compact unit. The exciter is driven by a V-belt, and a belt tension device is fitted.

—(Enquiry Ref. No. A.51/49.)

For internal communication

THIS IS THE NEWEST AND BEST SYSTEM

Save time, save steps and improve efficiency by installing this new system. All new features are outlined in Leaflet B.50, sent on request.

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Sound Equipments

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72, CAPE HILL, SMETHWICK 41, STAFFS.

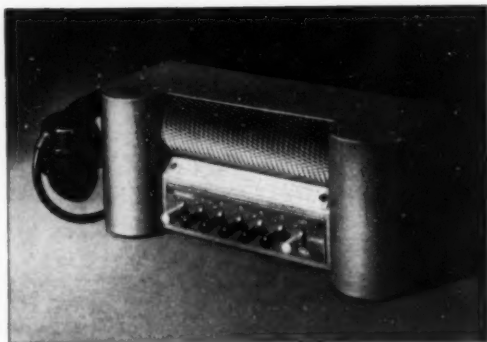


Illustration: the new 20-way Hadley Multicom for loudspeaking or ordinary telephone communication to all points.

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This is the machine YOU have been waiting for—but you need wait no longer, because A.C.E.C. can supply you without delay. It is the last word in dictating machines, and has just the features every executive dreams of—unerring efficiency in "taking down" by a secretary who does not interrupt, catches every word and, by the flick of a switch, reads back exactly what you've said in the way you've said it! If you don't like the sound of your last sentence, you simply re-dictate the improvement you want, and the previous wording is automatically obliterated by recording the new. And just one other thought—this "Secretary" is not "hard on the eyes"—in fact, it is a styled and elegant piece of office furniture, as you can see from the illustration.

Remember, it takes a full 12 minutes dictation, while for other details we hope you will communicate with



ATELIERS DE CONSTRUCTIONS ELECTRIQUES DE CHARLEROI (BELGIUM)

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Blueprint for British Industry

Continued from page 45.

a successful machine have been evolved. Principal advantages of this machine are its vastly increased output, its more automatic operation and the fact that it requires up to 30 per cent. less labour. First cost is higher, and more power is required to drive it, but these items are outweighed by the saving in production costs and overheads. The management are well satisfied with the results.

Probably the most important factor of all when a transfer from one area to another is carried out is that of *labour*. There was a considerable pool of labour in and around Darlington, but it was entirely green. Female operatives formed the bulk of the labour required and all these had to be trained by Patons & Baldwins. Training was one of the keys to the success of the Darlington project, and it merited, and received, con-

siderable attention. The methods used are dealt with in a further article on page 46 of this issue.

The most striking lesson learnt is, perhaps, that the teaching of the actual operations to be performed by an operative in a process is only half the battle. The organization of the job must be taught as well if the last 15 per cent. of efficiency—the difference between a good and mediocre operative—is to be achieved. Management have made good use of films to illustrate this aspect more clearly.

Job Analysis

An immense amount of preparatory work was put into the analysis of each job. This was done on the lines of the Ministry of Labour's "Training Within Industry for Supervisors" scheme. This detailed analysis has paid; it

has led to much improved methods of work—one of the fruits of starting afresh in an area without old established prejudices and ideas.

Equal importance has been placed on the training of future supervisors, and a number of young men, mostly between the ages of 20 and 27, have been carefully selected to be trained as overlookers. Their training has three aspects—technical knowledge of wool processes; knowledge of the organization of a process and the servicing of the machines; and, thirdly, skill in the handling of people. The last is regarded by management as of great importance.

It is hardly surprising to find that Patons & Baldwins have paid as much attention to welfare facilities as to factory layout. The canteen and social centre is a beautifully decorated and equipped building. The medical department is similarly fitted for its purpose. Both the health and canteen sec-

Continued on page 84



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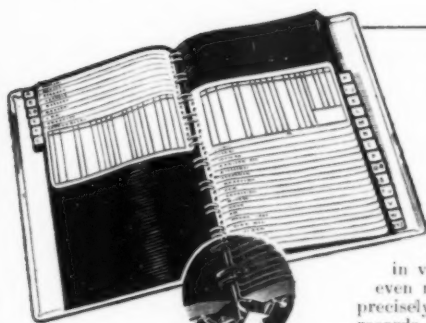
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 which these machines have been specifically designed.
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tions are described in detail elsewhere in this issue. Here it suffices to say that there is a welcome absence of that heavy-handed paternalism which so often mars the best intentions and wastes the money of so many welfare-minded firms. The facilities have been provided for employees as a dividend for work invested in the firm.

If efficiency exists in the factory it must be implemented by equal efficiency in the office. As might be expected, modern equipment is not the prerogative of the factory at Patons & Baldwins—it is evident throughout the administrative block. The firm were one of the earliest users of office machinery and to-day they have installed machines wherever their value would be felt. The overall result—as is shown in detail on page 56—is a high degree of mechanization—more in keeping with the U.S.A. than Britain. The aim is to obtain a flow of paperwork in one direction without back tracking and time wasting journeys.

Ask any P & B executive about

the factory and he will wax enthusiastic; what you do not hear of are the headaches and heartaches which must have been inseparable from a plan of this magnitude. Yet the directors say that knowing what they know now, they would do it again. There have been debits and credits to be weighed up. Capital cost of the factory has been far in excess of that contemplated in 1945, materials and wages have risen; offsetting this has been the saving in personnel due to conveying and a more economical layout of machinery, which proved greater than anticipated. The design of the factory is such that for many years the board can face with equanimity any change in machinery design.

Such is the story of Darlington—a forthright answer to the problems of increasing production, lowering costs and raising productivity. To the industrialist it is more absorbing than fiction; it is a signpost for to-day and as new as to-morrow.

END.

Training “green” Labour

Continued from page 47

skilled trainers, many of whom had not been inside a textile factory until a few months ago, has been built up adequate to cope with any intake of labour that can be expected.

At present, the initial technical training is carried out on the standard machines on the shop floor, but this is not regarded as a desirable practice. A special training room is under construction. In this will be installed specimens of machines in use in the factory. All new workers will be trained here, remote from the distractions and noise that all too often intimidate the nervous new entrant.

New entrants are split into groups and allocated to the women trainers. One trainer usually looks after three or four girls. Having been shown the first stage

Continued on page 46

Pictures that may **SHOCK** you!

The pictures your time and motion study engineer produces may indeed give you a shock. Such unsuspected shortcomings. So much waste of men and machines.

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BRANCHES THROUGHOUT THE COUNTRY

in the job, a new entrant tackles it herself, practising until she satisfies the trainer of her proficiency. She then tackles the second stage of the process, mastering this in turn before progressing to the third stage, and so on.

Once the complete process has been mastered, the question of dexterity of operation comes into force, and the time element is introduced. Each operative is given a productivity target. This is progressively increased, according to the worker's ability.

Failure to reach a target is usually due to slowness of movement in one or more stages. In such a case, these parts of the job are isolated and intensive practice on them is given against steadily increasing targets.

Organizing the Job

TO help also at this stage, training is given in organization of the job. This helps the trainee to attain a target comparable with



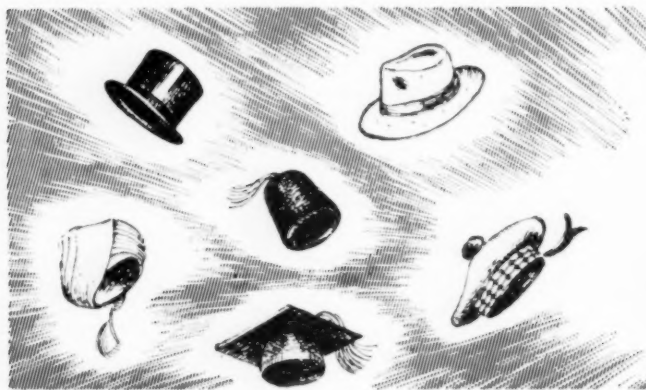
An example of an acquired skill. This operative was trained from scratch by Patons & Baldwins and is so speedy in her job of winding skeins of wool into hanks that the "BUSINESS" photographer had the greatest difficulty in getting her to stop in the middle of the operation in order that he could take his picture.

that reached by a fully trained and more experienced worker.

It is not enough for the operative to know the routine operations; she must be able to apply them in the most economical method. In spinning and twisting, for instance, bobbins and spindles must be fed to and removed from the frame, and the operative must continually walk the length of the frame to accomplish this. By starting the spindles in sections, and by other means, it is possible for her to minimize her movements, so cutting down fatigue, and to keep the maximum number of spindles running all the time.

Patons & Baldwins are convinced that it is in this organization of the job that the final difference between a mediocre and a good worker lies, and they have devoted considerable attention to the training in organization. In some cases, films have been made of the right and wrong way to organize a job, to illustrate the point clearly.

Continued on page 88



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During the five weeks' training period, the girls are paid a flat rate. Then, providing they are sufficiently efficient, they come on to piece rates.

Another valuable by-product of the preliminary job analysis was the fact that the various stages described for training purposes also formed a useful basis for the compilation of elements for time study. Every job has been carefully time studied (there is a full-time efficiency officer and staff) and the rates payable for each job have been based on these times. The average worker can, and does, earn a generous bonus as compared with the trade union minimum for the job.

Group Piece Rates

In certain departments it has not been possible to introduce individual piece rates, since the process depends on teamwork. In these cases a group piece rate system is in force; the groups, however, are

for the most part small—two or three workers.

Supervisory Problems

ON the supervisory side, the increased size of the unit at Darlington naturally brought problems. In a small mill, with only a few hundred workers, the line of command passed directly from the board through departmental managers to overlookers and thence to operators. Each man or woman was in direct contact with his or her immediate superior and, to an only slightly less degree, with the rank above that. Questions of supervisory training, promotion and consultation were solved easily by personal contact.

With more than 2,000 workers spread over 40 departments, the problem is very different, and the span of control is being uncomfortably stretched at every level. This has already been recognized, and to some extent alleviated, by the appointment in certain departments of foremen, to act as intermediaries

between departmental managers and overlookers.

A number of young men, between 20 and 25 are selected and trained as future overlookers. In the first stage, they are trained in wool technology, in conjunction with the Technical College at Darlington, and will take the Intermediate Examination of the City of London Guilds and Institute Certificate. They will then act as assistant overlookers, taking over an increasing degree of responsibility for the overlookers' tasks.

In due course, they will undergo the course on job relations of the T.W.I. for Supervisors scheme, and finally a course of lectures by Patons & Baldwins' top management executives on the organization of the company and the factory. This scheme is still in its infancy, but its very existence suggests that the company are well aware of their management responsibilities and problems and are determined to solve them.

END.

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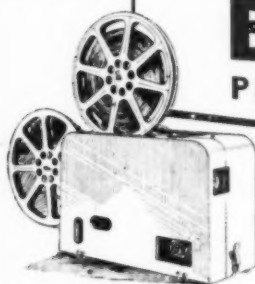
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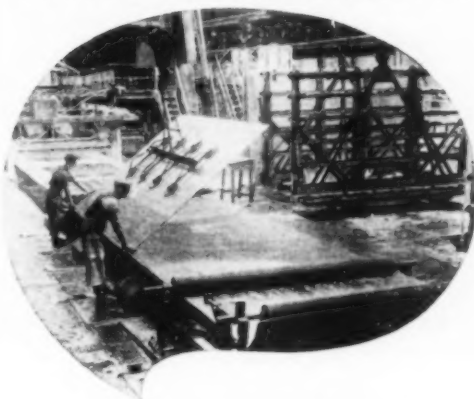
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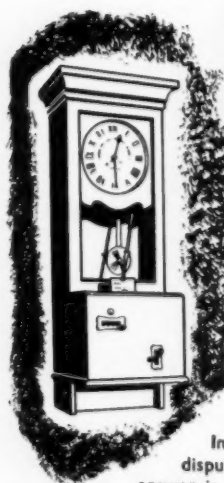
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How a Factory was Planned For Physical Fitness

By "BUSINESS" REPORTER



Opportunity is one thing. To seize it is another. One firm both had the opportunity—and took it. In the plans for a new factory they provided for buildings and services devoted to the health and welfare of all employees. This is how they did it, making full use of modern equipment of all kinds.



One of the well-equipped rooms in the medical block, which is situated apart from the main factory building.

A NEW factory building, on an open site with plenty of room for expansion, offers opportunity for the provision of health and welfare amenities of a high standard. At Darlington, Patons & Baldwins have taken full advantage of the opportunity, both in the provision of buildings and of services. Top management has, in fact, recognised its responsibilities and seized its chances.

Flanking the factory are two separate buildings, the one a personnel block, the other a social centre. Inside the factory itself close attention has been paid to cloakroom facilities, and cloakroom and lavatory blocks are scattered at convenient points in the building.

These are tiled and terrazzo-faced, with large numbers of mirrors, hand basins and foot baths. Attached to each block are clothes drying rooms, while clothes and personal property lockers are provided within the factory at points close to the machines and offices. Drinking fountains have also been installed at different points.

The personnel block contains the offices of the personnel officer and his staff, the training shed (still incomplete) and ancillary training rooms, interviewing and waiting rooms, and—separated by swing doors—the medical block.

The medical block is split into small interconnecting rooms, so that a number of patients can be

treated simultaneously if necessary. In addition, there are a waiting room, a reception room which acts as an office where medical records are kept, and rest rooms.

A senior nursing sister is in charge. Regular visits to the factory are made by a doctor. There is at present no regular medical examination of new entrants, but this will be introduced in due course. It is hoped also to introduce dental and chiropody services.

In view of the size of the factory, there are two first-aid rooms at different parts of the building, each in charge of a nurse.

The social centre utilises the canteen. Here are a concert and exhibition hall; a stage at one end is equipped with full stage lighting equipment, and the dressing room accommodation compares with that of many a London West-End theatre. These facilities are regularly used by a drama group, a musical appreciation society, a choir and a Scottish country dance

Programme of a fashion parade of hand-knit models made from P & B wool staged recently in the social centre. This stimulated employee interest in their jobs and in the firm.



society, all of them composed of workers in the firm.

A recent event in the exhibition hall was a fashion show of Patons & Baldwins hand-knit models. This served two purposes. It illustrated to a representative section of Darlington inhabitants the many uses that are made of the wool spun by the great new factory, and gave them an insight into the scale on which Patons & Baldwins work. At the same time, it showed the employees the final outcome of their work, and helped to build up that identity of worker and company that is so vital to a progressive concern.

A company sports officer has been appointed to organize sporting facilities. Some 25 acres of playing fields are under construction, and these will include association football grounds, a netball court, two full-size cricket pitches, 12 tennis courts and two bowling greens. The borders of the playing fields, which are adjacent to the factory are being laid out

with trees and shrubs, and other ground is being turned into landscape gardens, complete with sunken lawns and fountains.

All welfare facilities are open to all workers. A subscription of 3d. per week covers membership; this is deducted from earnings.

Framework is Built

The framework of a comprehensive health and welfare service has thus been built, and the details are in process of being filled in. This process, however, is not without its difficulties. Most of Patons & Baldwins workers, for instance, are women, who are notoriously harder to organize into voluntary associations than men. Many of them are married women, whose domestic responsibilities prevent them from taking part in organized social activities. Others must travel considerable distances to the factory. Transport facilities, though adequate during working hours, cease

after about 6.30 p.m., and special buses have to be provided for any evening entertainment. Above all, there has as yet been little time for the corporate spirit to develop without which even the most efficient welfare service is nothing.

These are problems that only time and goodwill will solve; the goodwill is certainly apparent, the company's progress and prospects ensure that time will be available.

Assessment of the value of a health and welfare programme is always difficult. Particularly is this the case when the programme is new. But the fact that in a new factory employing a high proportion of women many of whom have not worked in industry before, labour turnover is in the neighbourhood of 50 per cent, per annum and steadily falling, is significant. Absenteeism is less than 6 per cent, for all workers and all causes. These figures are considered reasonably satisfactory and are certainly well below the average for the wool industry.

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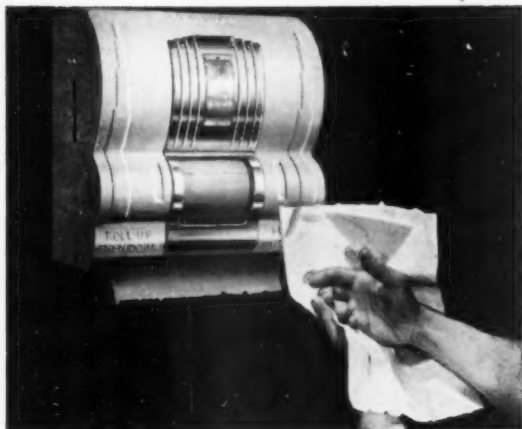


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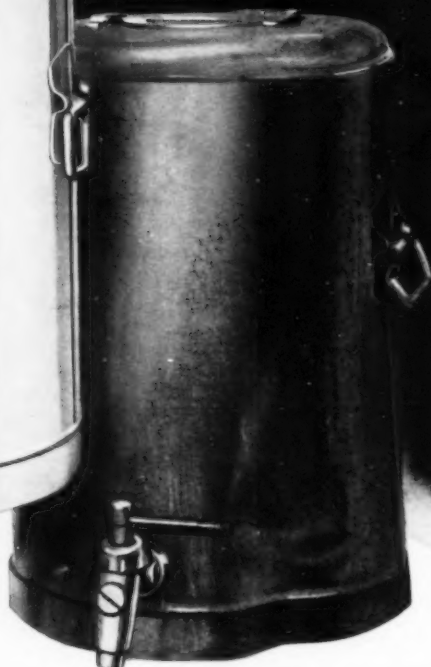
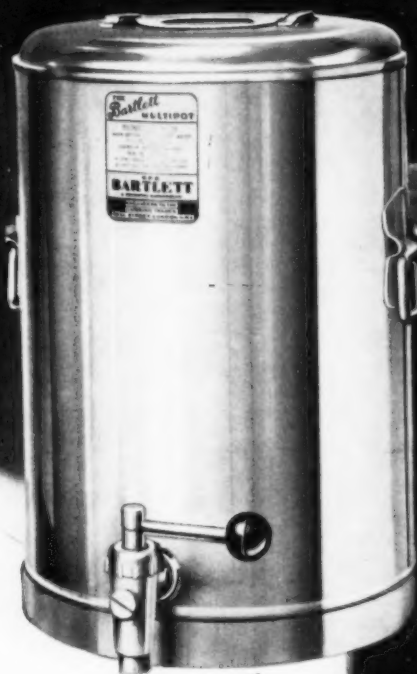
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S. B.16

This Firm Wins Full Marks For Canteen Management


By "BUSINESS" REPORTER

It's the management policy that matters. Then come application and execution of the policy. This article describes both the canteen policy of, and its application by, a farsighted board of directors. Noteworthy is the varied amount of equipment, electrical, gas, and steam, used in the efficient and hygienic preparation and cooking of food for all staff.

CANTEEN services are looked upon by the directors as part of the welfare facilities of the Darlington factory of Patons & Baldwins. Seen in this perspective, the fact that the canteen and its ancillaries do not make a profit, nor break even, is not regarded as unsatisfactory. The aim is to offer attractive meals and refreshments at reasonable prices.

The canteen block, which is situated alongside the factory, has been planned with the same care and attention to detail as the rest of the plant. It can be divided into four sections. The main section is the workers' canteen seating about 2,000. (This also acts as a theatre when required.) The other sections are the staff canteen, the directors' dining room, and the kitchens, canteen manager's office, etc. In addition, there are also tea bars in the factory which act as supply points for the morning and afternoon tea trolley service.

All employees have the same lunch break, beginning at 12 o'clock. *At this hour, therefore, the main canteen is faced with a great "peak load" of serving which literally lasts for only a few minutes.* Preparation and cooking can be spread evenly throughout the morning. But the serving—it is all on the cafeteria principle—during this key period must be fast



<p>1. POLICY : They treat the canteen as a welfare facility. Good facilities increase productivity.</p>	✓
<p>2. FOOD : They provide attractive meals and refreshments.</p>	✓
<p>3. PRICES : They keep prices low, within reach of all.</p>	✓
<p>4. SERVICE : They see that meals are served hot—and quickly, and offer adequate mid-morning and afternoon snacks.</p>	✓

course costs 1/- (half-price for juveniles), soup 2d., sweet 3d., and tea 1d. per half-pint. Snacks are all 6d.

Main meals average more than 900 a day, but the total number of people passing through the servery is usually about 1,600, the other 700 buying snacks, or tea to have with sandwiches which they have brought with them. This total of 1,600 is attended to at the 80ft.-long servery in, on an average, only 15 minutes. Last Christmastime a special lunch of chicken, ham, vegetables, Christmas pudding, mince pies and tea was served to more than 2,000 people in less than 20 minutes.

To deal with this vast number, the serving counter is staffed by 36 people. These are all staff who, for the rest of the time, are engaged in other work. For instance, a good number are drawn from the factory tea bars. In this way there is an adequate number of people serving at the peak period without labour being wasted before or after lunchtime.

The staff canteen also works on the self-service principle and normally caters for about 130 people a day. This total is spread over a longer period than the workers' canteen and as the food is exactly the same, there is no serving problem. Normally six persons are on

and faultless if trouble is to be avoided.

The mid-day meal consists of soup; two main courses—usually meat and two or three vegetables, with a standing alternative of fish and chips; and a choice of three sweets. In addition, there is a choice of several snacks, such as baked beans on toast, macaroni cheese, etc. Tea is, of course, also served. Prices are kept very low, to be within reach of all. The main

duty behind the staff canteen servery. These figures in no way represent the maximum capacity of the kitchen; in fact the equipment could cope with double the number, though the seating capacity of the workers' and staff canteens would necessitate two sittings.

Modern Equipment

BESIDES the preparing, cooking and serving of lunches, the kitchen also makes pies, pastries, bread rolls, fruit pies, etc., for sale on the trollies in the factory. Equipment, as would be expected, is modern and well arranged.

Electrical preparing machines include two mixers, two mincers, two slicers and a potato peeler. The amount of cooking equipment is impressive—six large steam ovens, six large roasting ovens, six solid top gas cookers with ovens, a six-pan fish frying range, one large bain marie, two grills, and six 30-gallon steam-jacketed boilers. A large electric dish washer is also a necessary labour-saving machine, and there is space for another should expansion warrant it.



Tea trolley leaving one of the strategically-placed tea bars. Each trolley serves between 120 and 160 persons per run.



12.30 in the main canteen. The hall seats 1,500, is the largest in Darlington, and has a fully-equipped stage and dressing rooms. The servery is through the doors on the right.

A particularly noteworthy feature is the air conditioning apparatus. This, coupled with large aluminium ducts, completely removes food odours, steam, etc., making working conditions for the staff as good as any in the country.

The kitchen has a permanent staff of 11—one chef, three cooks, three assistant cooks and four others. In addition, there is a bake-house staff of six.

To provide morning and afternoon refreshments in a factory the area of Patons & Baldwins, it is impossible to supply trollies from the main canteen kitchen. So in the factory itself seven tea bars have been established in strategic points, to act as sub-kitchens and supply points. Each tea bar averages about 20 sq. ft. in size and is equipped with water boiling apparatus, sinks, drain boards, etc. There is storage space for tea mugs and the trollies themselves.

Eighteen trollies are split up among the tea bars. They are of standardised design, carrying an eight-gallon multi-pot. Each serves between 120 and 160 people per run and is "manned" by one girl. Besides tea, hot pies, rolls, patties, bread and butter, and pastries are available. These supplies are sent

to the tea bars from the main canteen kitchen in specially-designed electric trucks, for distribution on the trollies. The trollies leave the tea bars on the first runs at 9 a.m. and 3 p.m. each day. (One exception is the tea bar serving the office staff, where the morning service does not begin until 9.30 a.m.)

A Policy That Pays

FINANCIALLY the tea bars do not pay. They need a relatively large staff and earn only a limited amount in sales. But the directors of Patons & Baldwins, as befits their welfare policy, look on them as an important service, for they want to encourage workers to eat something fairly substantial in the morning. They realise that many of their female workers come from some distance away, which means early rising. They realise that a number of employees, more usually girls than men, miss breakfast altogether, or at least have something very unsubstantial to eat.

The directors' policy is justified—on an average morning more than 700 meat pies are sold from the trollies.

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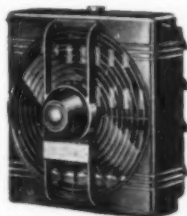
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NEW FOR YOUR OFFICE

Continued from page 60

—the main one situated centrally, directly below the register, and the supplementary multiplication keyboard in one line at the right of the machine. Division lever and carriage movement keys are situated between the two keyboards. A lever placed at the top left of the machine is used for multiplying a sum and subtracting it from a number already in the machine.

In the "longest" models, the products register is split and is operated by a push button. This en-

ables totals to be accumulated on the left of the register, while the individual problem is shown on the right. The clearance bar clears the right of the register only as long as the operator's button is pulled out.

Attractively finished and sturdy, the *Peerless* should stand up well to continuous long-term usage.

— (Enquiry Ref. No. 04/16.)

Filing Helper

A HANDY steel filing shelf which is easily attached to the open file drawer keeps papers in order and brings them within easy reach for rapid filing.

The attachment can be conveniently hooked on to any type of drawer pull, rubber pads preventing scratching of filing cabinet fronts. A bail secures papers in



This detachable shelf speeds filing.

pre-arranged order and a groove—formed in front—holds pen or pencil. The shelf is finished in olive-green or gray-rite.

—(Enquiry Ref. No. 04/17.)

Silent Ventilation

ONE answer to the disadvantages of ventilating the office by simply opening windows is the *Extravent* window fan. Completely eliminating the necessity of street noises, cold draughts, blowing papers, etc., this light-weight, ventilating unit withdraws stale unhealthy air silently and quickly.

When mounted on the window or on to a light wood or metal seating, air is changed at the rate of 10,500 cubic ft. per hour, with the 6in. unit, and 18,500 cubic ft. per hour with the 9in. type. Four to eight air changes per hour are accomplished by one unit in most offices.

The *Extravent* is made of aluminium throughout, has a totally enclosed motor and is resistant to atmospheric corrosion. It is

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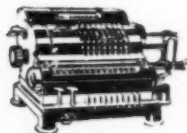


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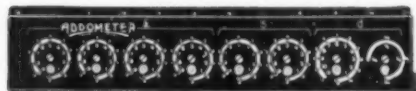


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When ordering state for what purpose required.

All models price 6 guineas.

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NEW FOR YOUR OFFICE

Continued from page 100



Stale air is silently and quickly withdrawn by the Extravent window fan.

mounted directly into the window pane and is safe to mount on a small pane, $\frac{1}{4}$ in. thick (minimum), or a large pane, $\frac{3}{16}$ in. thick. The "aerodynamic" dome, on the outside of the unit, prevents back draught when it is stationary.

The Extravent is economical in operation and attractively finished. A variable speed control switch can be supplied with the larger unit if

required. Though normally used for the extraction of stale air, the makers can adapt the unit to draw fresh air into the room.

—(Enquiry Ref. No. 04/15.)

Swedish Typewriter

WIDE use of ball bearing action is a feature of the Swedish Halda typewriter which incorporates aids to the production of clear, even script in its design.

Special steel bearings are used to support the carriage in three points as well as in 46 other vital places. Automatically accelerating type bars, and a simple touch regulator, are features which help in easy

typing and the production of sharp, definite characters. Touch is adjustable to six degrees.

The Halda is made with a range of seven different platen widths, from 10 in. to 24 in. The machine can be obtained with keyboards for practically any language, including Latin, Arabic and Hebrew.

Where work includes reproduction of chemical and mathematical formulae, measurements and square, cube and degree signs, etc.,



The Swedish built Halda typewriter.

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- ★ **Board Meetings, etc. . . .** Information can be given/broadcast first hand to all present—including overseas calls.
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these can be typed without adjustment of the platen. Besides the normal one, two and three line spacing, there are also half spacings, giving a total of five variations. Paper is kept in the correct place by a double-articulated paper bar which will move up or forward as required.

Shock free tabulation is easily set up and removed by using the tabulator setting button and the release. One or all of the tabulator stops can be removed by either pressing the general tabulator release or the single clear key at the back of the machine.

The *Halda* is of solid construction and is finished in a dull-green non-reflecting colour which is easy on the eyes.

—(Enquiry Ref. No. 04/14.)

Clears the Desk

HELP for the executive harassed by a paper-cluttered desk top and inevitable "catch all" filing baskets is offered by the makers of a compact, easily-accessible suspension filing system.

The *Vetro Organizer* has been designed to house papers of a transitory nature and will take



either quarto or foolscap folders. The frame, constructed from chromium plated polished tubular steel, is fitted with rubber feet, making it particularly suitable for desk use.

An assortment of tabs are available, including those printed with either the usual business titles or indexed numerically, alphabetically and by month etc. Plain inserts for producing tab titles as desired can also be obtained. Celluloid shields can be supplied in seven different colours.

—(Enquiry Ref. No. 04/19.)

APRIL, 1951



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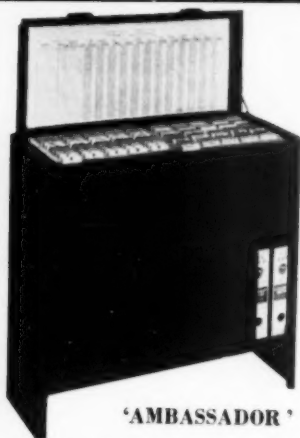


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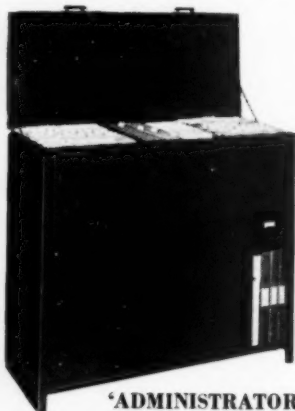
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A REMARKABLY simple and effective method for labelling returnable containers of all types is provided by a new series of patented labels known as the *Bi-Way*.

Printed on light board, they are orthodox in appearance, bearing the name and address of the consignee with a blank space for the address of the consignee. The top and bottom left hand corner of the labels, however, are folded over and printed with the words "To" and "From" in red in the appropriate positions for outward delivery. These corners are tacked into position when the label itself is tacked on to the crate.

There is a light perforation along the fold, so that all the consignee has to do on returning the case is to tear off the corners. This exposes the words "To" and "From" in the reverse position on the face of the label.

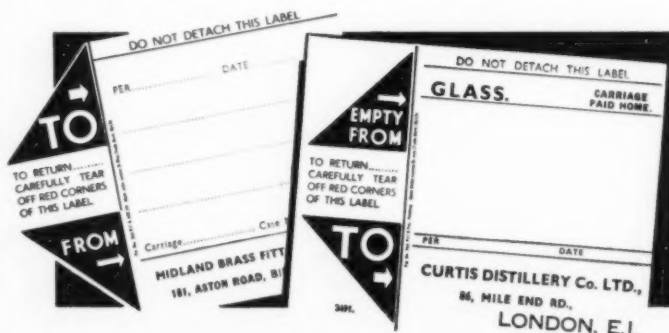
Any printing can be done on the labels according to requirements. One firm, for instance, expands the label to include a detachable delivery note setting out the contents

of the crate; this is folded over and stapled for secrecy. A tie-on label works on the same lines, the folded corners being held down by a single staple. A gummed label is also being developed which gives a similar result.

Re-using Obsolete Envelopes

WITH the deterioration of stationery supplies, the use of used and obsolete envelopes is again becoming essential. One danger here lies in the fact that incomplete obliteration of previous addresses may cause important memos to go astray.

The Ministry of National Insurance obviates all risk of this by using a rubber stamp larger than the envelope itself to obliterate completely everything written or printed on one side. The new address is then typed on a gummed label and stuck on the other side. The result is unsightly, but it does ensure that all memos and letters reach the right person.



First Post-War Scottish Exhibition

THE first Scottish Business Equipment and Management exhibition to be organized by the Office Appliance Trades Association since before the war, was opened by the Rt. Hon. Lord Provost of Glasgow, Col. V. D. Warren, M.B.E., T.D., at the McLellan Galleries, Glasgow, on February 20.

More than fifty firms exhibited at the exhibition, held at the invitation of the Glasgow Chamber of Commerce and the Glasgow Engineering Centre.



ONE third of the typewriters stolen are ultimately recovered and restored to their owners—thanks largely to the work of the Typewriter (and Allied) Trades Federation.

For several years now the Federation has been responsible for the publication to its members and to certain other members of the Trade of a monthly booklet listing the serial numbers of typewriters and other Office machines which have been reported missing.

The source of notification is usually members of the trade themselves, H.M. Stationery Office for government departments and New Scotland Yard for all police forces throughout the country.

Very often these machines are lost or missing without any other suggestion being made. In many cases however, they are known to be stolen and are therefore reported to one or other of the bodies named above.

The Federation publishes this booklet free to all its members in the belief that by so doing they can further the ends of justice and protect their members from handling or dealing in typewriters whose origin is doubtful. In addition, the Federation maintains a more comprehensive index stretching back over many years.

Continued on page 106

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Adjustment can be effected to within a quarter inch of any card or document size. The drawers can be divided as required for any size of record, and the units are so constructed to give solid cabinet strength in all circumstances.



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Amselock have achieved a successful solution to the problem of providing maximum filing capacity in minimum space. Four standard drawers differing only in height, provide filing capacity for any dimensions of card, file or paper, etc.

This internal flexibility can then be combined with the established Amselock system whereby individual cabinets are readily integrated into assemblies or desks, combining functional efficiency with maximum space economy.

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MR. Charles Pike, managing director of the Aerograph Co. Ltd., for the last 19 years has been appointed chairman of the board. He has recently completed forty years service with the company.



WELL known to many in the office equipment industry as the advertising manager of Burroughs Adding Machine Ltd., Mr. A. F. Borcham has now transferred to other duties. One of his principal responsibilities will be the development and production of *Burroughs News*—house organ of the British organization—of which he is editor-in-chief.



LAMSON Engineering South Africa (Proprietary), Ltd., has been incorporated to operate independently the Lamson agency previously held by Associated Engineers Co., Ltd. The new company will work in close co-operation with its associated company, Lamson Paragon South Africa (Pty.) Ltd.



DURING 1950 machine production of the National Cash Register Co., Ltd., at Dundee amounted to 26,000 (against 19,261 in 1949) of which 11,000 were exported, or nearly 2,250 more than last year. The export target set the firm by the government was £720,000 and the actual shipment value of exports amounted to £1,100,000.

The total production of the firm's factory during 1950 amounted to £3,100,000 or £1,114,000 more than in 1949 and the selling organization reported a total turnover of £4,928,826.

Orders received during the year were worth £5,100,000.

Mr. N. T. Carne, resident director and factory manager, in a New Year message to the staff, stated that the American parent company had placed substantial orders with Dundee for export to the U.S.A. in 1950.

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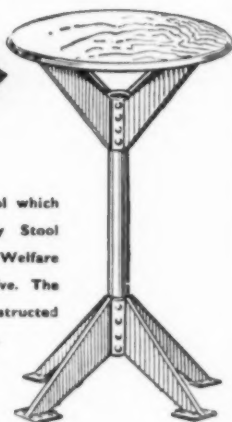
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TO-DAY'S MOST INEXPENSIVE

factory stool



Here it is at last — the factory stool which allows the suggestions for Factory Stool Design contained in Ministry of Labour Welfare Pamphlet No. 6 and is also inexpensive. The 'SITU' is simply, yet strongly, constructed of steel, with a varnished wooden seat. Attractively finished in olive green.

Available in heights ranging from 18 to 26 inches

Diameter of Seat - 13½ inches

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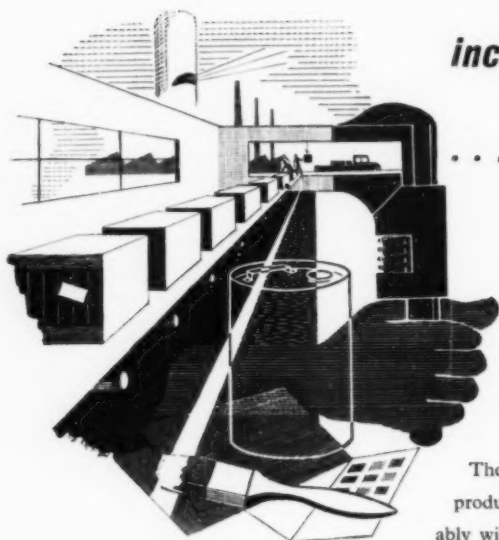
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